DOCUMENT RESUME

ED 266 650	FL 015 482
AUTHOR	Schuster, Don, Ed.
TITLE	Journal of the Society of Accelerative Learning and Teaching, Volume 8, Numbers 1-4, 1983.
INSTITUTION	Society for Accelerative Learning and Teaching, Inc.
PUB DATE	83
NOTE	144p.
PUB TYPE	Reports - Descriptive (141) -- Guides - Classroom Use - Guides (For Teachers) (052) -- Collected Works - Serials (022)
JOURNAL CIT	Journal of the Society for Accelerative Learning and Teaching; v8 n1-4 Spr-Win 1983
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Acceleration (Education); Classification; *Classroom Techniques; Curriculum Development; Educational Research; Foreign Countries; Imagination; Industrial Training; Intensive Language Courses; Literature Reviews; Programed Instruction; *Psychological Studies; *Relaxation Training; Second Language Instruction; Simulation; *Teaching Methods; Verbal Learning
IDENTIFIERS	Consciousness; *Suggestopedia; Yoga

ABSTRACT

The spring-summer and fall-winter 1983 numbers of the journal include these articles: "Body-Mind Integration Through Yoga" (Marie Paulyn); "The Effectiveness of Three Classroom Teaching Methods: Programmed Instruction, Simulation, and Guided Fantasy" (Elizabeth B. Groff, Gary F. Render); "Teaching Relaxation in School: A Survey of Research and Empirical Studies" (Sven Setterlind); "Socio-Cultural Environments and Suggestopedia" (Milla Bayuk); "Some Implications of Consciousness Research for Education" (Stanley Krippner); "How to Develop a Non-language Course Using Accelerative Learning" (Ron Ennis); "Toward a Taxonomy of Methods for Improving Teaching and Learning" (Win Wenger); "A Taxonomy of Methods to Increase Human Intelligence" (Win Wenger); "Suggestive Accelerative Functioning in Industry Training" (Otto Altorfer); "Contents and Boundaries of Understanding 'Intensive Training'" (Alex A. Leontiev, Galina Kitaigorodskaya); "Yoga Factors in Accelerative Learning" (W. Jane Bancroft); and "Evaluation of a Vibrating Chair in Facilitating Verbal Learning" (Donald H. Schuster). (MSE)

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THE JOURNAL OF THE SOCIETY FOR ACCELERATIVE LEARNING AND TEACHING

Volume 8, Numbers 1 & 2 Spring / Summer 1983

ED266650

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Published by the Society for Accelerative Learning and Teaching, Inc.

ISSN 0273-2459

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The Journal of the Society for Accelertive Learning and Teaching
Psychology Department, Iowa State University, Ames, Iowa 50010

THE JOURNAL OF THE SOCIETY FOR ACCLERATIVE LEARNING AND TEACHING

Volume 8, Numbers 1 & 2 Spring/Summer, 1983

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Eric/CII
FEB 12 1986
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Mailing Permit 190, Ames, Iowa 50010.
Printed in the U.S.A.

J. of the Society for Accelerative Learning and Teaching, 1983,
8/1 & 2

Body/Mind Integration Through Yoga*

Marie Paulyn

Abstract

Certain yoga techniques have been used since prehistorical times to develop the memory. Steps in the sequence to achieve an optimal receptive state to learn large amounts of new information are breath control, thought control, concentration, use of appropriate music and teacher's voice control.

In the East, Yoga has been used for thousands of years in order to develop a harmonized body/mind connection. The ancient texts, the Vedas and Upanishads, were entirely memorized in order to keep alive the traditions and to pass on to the initiates the precious esoteric knowledge. For this purpose, it was essential to develop the memory and to find ways to increase the absorption of new knowledge.

In order to achieve an optimum receptive state and to allow the brain to function at a much better level than normally, several steps have to be undertaken.

1. Deep relaxation and breath control (Pranayama). Both are prerequisites for slowing down the brain waves to a count of 7 to 13 cycles per second (alpha level) from the regular 13 cycles and above (beta level). It is in the alpha level that one reaches slightly altered states of consciousness, states of reverie, necessary to block mundane thoughts and achieve a receptive state particularly conducive for absorbing new information.

2. Control and heightening of sensory perceptions (Pratyahara). In order to sharpen one's concentration, one has to learn how to selectively filter out from the environment the one sensation which one chooses to heighten (hearing new words), or to block out (noise, pain).

3. Concentration (Dharana), leading to one-pointedness, can only be successfully achieved once the deliberate control of outside and/or inside stimuli has been undertaken.

4. Music, specially chosen to create a resonance with the respiratory rhythm, is particularly conducive to a state of relaxed attention, indispensable for achieving heightened mental performance.

5. The voice of the teacher is extremely important. Modulation and the tone of voice play a great part in achieving the desired state of profound physical relaxation and heightened brain receptivity.

As every sound is a vibration, through Yoga one learns to absorb the teacher's voice's vibrations through the entire body, not just through the ears (each muscle has a memory of its own). A synergistic blending of various sensory perceptions occurs, creating an optimum state of receptivity.

In order to prepare the body for such deep states, Yogic postures are specifically designed to either strengthen, stretch or stimulate various body parts. Each group of physical postures is followed by a group of counterpostures and a brief guided relaxation. Certain physical movements help re-establish certain neurological connections, thus directly affecting the brain. The student's attention to the body's responses to the postures is essential in order to achieve an attunement (at-onement) to the various blocks and rigidities one will inevitably discover.

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*Paper presented at the 1982 SALT Conference

At the physical level, one has to become so sensitized to one's own limitations that one should always stop before experiencing pain. Pain is the signal that one has gone beyond one's level, allowing the impatient ego to force the body into a position for which it is not yet ready, emotionally as well as physically. There is no competition, we are not only different from each other, we are unique. Acknowledge this uniqueness and make the best of it. Keeping the eyes closed during the body's movements helps prevent competitiveness and possible injuries.

By the end of the physical session, it is essential to reach a state of deep relaxation. This requires an act of will; one cannot just stop moving and start relaxing.

Relaxation, the act of discontinuing tension, demands a mental effort of concentration and a thorough cooperation between thoughts and sensations. Muscles are held in a state of chronic tension because they continuously receive impulses from the autonomic nervous system. In relaxation, there is a restoration of the neuro-muscular balance in the organism. This can only be achieved through total attunement to one's body and through a conscious dialogue between the body and the mind (tensing and relaxing every part of the body).

Once the body reaches a state of perfect limpness, the mind is not needed any more to control it, and a gradual "letting go" occurs. This letting go is essential to allow a thorough mind/body integration. Once the body relaxes sufficiently on its own, needing no more monitoring from the brain, the mind, free from its customary obligations, can be used for more specific tasks, such as receiving and stocking new information, solving intuitively previously unresolved problems, and achieve a state of transcendance from the mundane.

Intégration du corps et de l'esprit au moyen du yoga.

Certaines techniques de yoga sont utilisées depuis la préhistoire pour développer la mémoire. Les étapes successives pour parvenir à un état de réception optimale pour retenir une quantité énorme de renseignements nouveaux sont le contrôle de la respiration, le contrôle de la pensée, la concentration, l'usage d'une musique appropriée et le contrôle de la voix de l'enseignant.

Körper/Geist Integration durch Joga.

Seit prähistorischen Zeiten sind gewisse Jogaverfahren angewendet worden, um die Erinnerungsfähigkeit zu entwickeln. Stufen, die erforderlich sind, um den höchstrezeptiven Geisteszustand zu erreichen sind die Regelung des Atmens, die Regelung des Denkens, Konzentration, Gebrauch von geeigneter Musik und Regelung der Stimme des Lehrers. Wenn diesem Prozess gefolgt wird, kann viel neue Information gelernt werden.

Cuerpo/mente integración a través del yoga.

Ciertos técnicas del yoga han sido usados desde tiempos prehistóricos para desarrollar la memoria. Los pasos en la secuencia para obtener un estado receptivo óptimo en el aprendizaje de grandes cantidades de nueva información son: control de la respiración, control del pensamiento, concentración, uso de la música apropiada y control de la voz del profesor.

J. of the Society for Accelerative Learning & Teaching, 1983,
8/1 & 2

The Effectiveness of Three Classroom Teaching Methods: Programmed Instruction, Simulation and Guided Fantasy*

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Abstract

This study investigated the effectiveness of three classroom teaching methods: programmed instruction, simulation and guided fantasy, in terms of improvement in achievement as a function of the treatment in a unit of social studies at the fourth grade level. The treatments were purposely designed to facilitate achievement in a social studies unit. The results indicate that significant gains in achievement were made by all groups including the control group. There were also significant differences between groups.

Introduction

Instructional procedures used by classroom teachers are significant in guiding the development of pupils' level of knowledge and achievement. Although much research on learning has been conducted in the past, only recently has systematic attention been given to methods of instruction. It is necessary to evaluate instructional procedures used in relation to resultant outcomes. To accurately assess which methods are effective for which purpose, experimental research is needed.

Therefore, it was the purpose of this experiment to investigate the effectiveness of three classroom teaching methods: programmed (expository) instruction, simulation and guided fantasy, in terms of improvement in achievement as a function of the treatment in a unit of social studies at the fourth grade level.

Expository teaching.

Expository teaching is often referred to as deductive teaching because the teacher presents the student with the entire content of what is to be learned in final form. Expository teaching can present a rich body of highly-related facts, concepts and principles which students can learn and transfer, and which results in an efficient (time-saving) approach.

Programmed instruction is a form of expository teaching. Skinner (1968) suggested that programmed instruction is a plan for making effective use of reinforcers, or feedback, not only in shaping new behaviors but in maintaining behaviors. He said a good program leads students step by step, each step within his range, based on operant conditioning, in which there is a basic contingency between an act and its consequences. The student gets immediate corrective feedback or reinforcement.

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*Portions of this paper were presented at the Annual Meeting of the American Educational Research Association, New York, March 1982.

Glaser's (1966) studies support the use of programmed instruction, the Ruleg system (rule, then example) specifically, in which the student is presented with an explicit statement of rules or principles followed by one or more carefully chosen examples. Keislar (1959) and Keislar and McNeil (1961) conducted experimental research using programmed instruction with sixth graders who scored significantly higher on the posttest than did a control group which did not receive programmed instruction. These studies showed acquisition of a demonstrated type occurs with programmed instruction. Carroll (1963) said the major variable is rate of learning (time spent on completing a task). Research by Krumboltz and Weisman (1962) and Hershhberger and Terry (1965) pointed to the significance of type and degree of feedback: more confirmation yields fewer errors; difficulty and consequent error rate may be a function of delay in feedback.

Most research with programmed instruction tends to center on situations unlike the classroom. More comparative research regarding programmed instruction and other classroom teaching methods is needed.

Simulation.

Historical development of simulations or games, suggests a gradual process of the recognition of potential learning functions thereof. Only within the present century have games been intentionally designed for specific educational goals. Many gaming experts and educational psychologists (Moreno, 1953; Piaget, 1948; Caillois, 1961) have agreed that gaming as an instructional medium can be a powerful classroom tool. The game design and selection of key concepts and relationships are significant to increased achievement (Orbach, 1977).

Research has indicated that simulations do not teach more cognitive information than do more conventional methods. Boocock (1963), Boocock and Coleman (1966), Cherryholmes (1965), Garvey and Seiler (1965), and Robinson, et al. (1966) concurred with this finding. However, it was theorized that this was due to the strategy game model on which simulation investigation in the past has been based. The strategy game model is by design open-ended, and it therefore cannot strictly control content which is often the major conveyor of cognitive information.

In 1966, Baker was the first to demonstrate that a simulation had greater effect on achievement when it was content-oriented. Therefore, evidence suggested that when altering games toward a content orientation, the results of a comparison between this method and a conventional method would favor simulation (Stembler, 1975).

Gaming experts have suggested further comparative research with simulation games to better assess the significance of achievement gains made as a result of learning through simulation.

Guided fantasy.

Fantasy, or mental imagery, offers possibilities of learning, understanding and retaining information through symbolic identification with elements. It serves as a tool of integration (Crampton, 1975). Speculative scientific research has suggested that the brain is double, each cerebral hemisphere being capable of functioning independently, each in a manner different from the other. There are two different sets of information-processing rules (Bogen, 1975). The fantasy approach offers opportunity to invoke potential of both sides of the brain integrating rational, analytical thinking with intuitive, creative thinking. To date, little empirical research has been conducted in comparing guided fantasy with other more conventional classroom teaching methods for learning and retaining information.

Conclusion.

A review of the literature revealed the need for comparative research in the effectiveness of these classroom procedures (programmed instruction, simulation, guided fantasy) in relation to achievement and retention. Few studies have compared the effectiveness of methods purposefully designed to facilitate achievement or specifically concerned with the same content. In particular, the use of guided fantasy as a tool of integration in the classroom has received little systematic attention.

In conducting such comparative research, then, it is significant that the methods are designed to deliberately teach to cognitive outcomes. More accurate assessment of the effectiveness can be made if this objective is initially clarified and is reflected in the procedural designs.

Method

Subjects.

Subjects (Ss) were 57 fourth graders identified from the population of students in a southwestern Wyoming school district. All Ss had been randomly assigned to classes previously by the administration. One subject was identified as an outlier, falling 3.5 standard deviations below the mean of the control group achievement scores (112), and hence was not included in the final analysis. Treatments were randomly assigned to teachers and classes.

Treatments. Three teachers were randomly assigned to three instructional procedures. The control group teacher used conventional methods. The content used in each method was the same and was based on that information covered in the text book. The unit focused on the history of beaver trapping and trading in Wyoming. All teachers received a chapter outline and behavioral objectives. All treatment Ss also received copies of the same behavioral objectives. The treatment was administered in 40-minute periods on three consecutive days. The investigator did not actively participate in the administration of the treatment, but was available to assure that procedures were carried out as directed. The following were the three methods used.

1. **Programmed instruction.** Content information was recast in the form of a programmed booklet of the branching type, which allows the learner to make, identify and correct errors. Whatever errors made are corrected before new information is given. Subjects used the booklet in the classroom during regularly-scheduled periods. The teacher was available for questions. No other activity was employed.

2. **Simulation.** Content information was recast in a simulation (role-playing game), in which Ss were assigned to roles and given a minimum number and type of aids and props and a brief scenario and description of roles and situations. Transactions took place in timed intervals within the classroom setting. Debriefing or discussion followed the simulation.

3. **Guided fantasy.** Content information was recast in a guided fantasy journey in which Ss were led by the instuctor in creating mental images. Pictures pertaining to the content were shown previously to the

guided fantasy. Debriefing or discussion about the Ss' experiences followed.

Instrumentation.

An achievement measure of 42 items (matching, multiple choice, true-false, and completion) constructed by the investigator was used. Items were constructed to test stated objectives. Coefficients of stability and equivalence with a time period between administrations was obtained. A coefficient of equivalence of .67 was computed between pretest and posttest with a one-week time period elapsing. A coefficient of stability of .74 was computed between pretest and retention test with a five-week time interval. The pretest and retention test were identical, whereas the pretest and the posttest were alternate forms. These correlation coefficients represent a moderate level of test-retest reliability. Scores were determined by the number of correct answers.

Results.

To check for group equivalency beforehand, the mean achievement scores for each group were computed (see Table 1). Scores from the 1978 Science Research Assessment were used. A one-way analysis of variance of mean achievement scores pretest showed there was no significant difference among the groups ($p<.05$); see Table 2. The data were submitted to a Cochran's C test. No violation of the assumption of homogeneity of variances occurred.

Table 1

Means and Standard Deviations of Pretest Achievement Scores

Group	Ss	Mean	S.D.
Programmed Instruction	13	111.61	12.72
Simulation	11	118.00	8.92
Fantasy	14	113.29	14.67
Control	14	112.14	13.24

Table 2

Analysis of Variance of Pretest Achievement Scores

Source	df	SS	MS	F	p
Between Groups	3	295.179	98.393	.604	.615
Within Groups	48	7813.645	162.784		
Total	51	8108.824			

Cochran's C = maximum variance/sum (variances) = .3407

The means of the group gains and group standard deviations were summarized for pretest-posttest gains (see Table 3). Gains in achievement were made by all groups. A one-way analysis of variance showed there was a significant difference among groups ($F=3.821$, $p<.05$); see Table 4. A multiple range test revealed that the control group differed significantly from the programmed instruction group and the guided fantasy group, the latter groups showing higher mean gains. The simulation group was not significantly different from the other groups.

The Cochran's C statistic demonstrated that the variances were relatively homogeneous.

Table 3

Posttest-Pretest Mean Gains by Group Treatment

Group	Ss	Mean	S.D.
Programmed Instruction	14	12.64	4.40
Simulation	14	10.29	5.21
Fantasy	15	12.07	3.61
Control	14	7.43	4.72

Table 4

Analysis of Variance of Posttest-Pretest Mean Gains

Source	df	SS	MS	F	p
Between Groups	3	232.830	77.610	3.821	.015
Within Groups	53	1076.433	20.310		
Total	56	1309.263			

Cochran's C = maximum variance/sum (variances) = .3318

The means of group gains and group standard deviations were summarized for retention-pretest gains (see Table 5). A one-way analysis of variance revealed no significant differences among groups (F = 2.61, p<.05); see Table 6. However, the F test approached significance (p = .06). The Cochran's C statistic showed that homogeneity of variance held.

The t-test results determined that the mean gain of all groups was significant beyond the .001 level (see Table 7).

Table 5

Retention-Pretest Mean Gains

Group	Ss	Mean	S.D.
Progammed Instruction	14	11.43	5.43
Simulation	14	12.57	4.11
Fantasy	15	10.53	3.68
Control	14	8.14	4.03

Table 6

Analysis of Variance of Retention-Pretest Mean Gains

Source	df	SS	MS	F	p
Between Groups	1	148.362	49.454	2.610	.061
Within Groups	53	1004.304	18.949		
Total	56	1152.666			

Cochran's C = maximum variance/sum (variances) = .3870

Table 7

Means, Standard Deviations, Correlation Coefficients and t Values by Group and Testing

					Correlation		Difference	
Group	Test	Ss	Mean	S.D.	Value	Prob.	t	Prob.
Programmed	Pretest		20.14	6.75				
Instruction		14			.78	.001	-10.76	<.001
	Posttest		32.79	6.48				
	Pretest		20.14	6.75				
		14			.74	.002	- 7.87	<.001
	Retention		31.57	8.02				
Simulation	Pretest		26.57	5.02				
		14			.16	.586	- 7.39	<.001
	Posttest		36.86	2.41				
	Pretest		26.57	5.02				
		14			.62	.018	-11.45	<.001
	Retention		39.14	2.00				
Fantasy	Pretest		26.33	4.89				
		15			.72	.003	-12.93	<.001
	Posttest		38.40	4.69				
	Pretest		26.33	4.89				
		15			.69	.004	-11.08	<.001
	Retention		36.87	4.36				
Control	Pretest		22.71	4.46				
		14			.68	.008	- 5.69	<.001
	Posttest		30.14	6.41				
	Pretest		22.71	4.46				
		14	.83	.000	- 7.55	<.001		
	Retention		30.86	6.88				

In anticipation of differences among groups in terms of the dependent variable and because groups had not been directly formed by random assignment, an analysis of covariance was computed to adjust for pretest differences (see Table 8).

Table 8

Analysis of Covariance of Posttest Scores by Group and Pretest

Source	SS	df	MS	F	p
Covariate: Pretest	937.959	1	937.959	56.315	.0001
Main Effects: Group	269.455	3	89.818	5.393	.0026
Residual	866.092	52	16.656		
Total	2073.506	56	37.027		

Covariate Beta (Pretest) = .699

The main effect of group treatment on adjusted posttest scores was significant (F = 5.393, p<.01). The Scheffe post-hoc comparison was used to determine which mean gains were significantly different. The fantasy group gain was significantly higher than both the control group and programmed instruction mean gains.

In Table 9, we have tabulated similarly the analysis of covariance of group treatment on adjusted retention scores with a resulting significant main effect. The Scheffe post-hoc comparison revealed that both the fantasy group and simulation group mean gains were signficantly higher than the programmed instruction and the control group mean gains.

Table 9

Analysis of Covariance of Retention Test Scores by Group and Pretest

Source	SS	df	MS	F	p
Covariate: Pretest	1353.537	1	1353.539	77.250	.0001
Main Effects: Group	192.325	3	64.108	3.659	.0181
Residual	911.120	52	17.422		
Total	2456.982				

Covariate Beta (Pretest) = .8398

In summary, results illustrate a significant gain in pretest-posttest and pretest-retention test scores for all groups. Also, on the pretest-posttest gain, the control group mean was significantly lower than the programmed instruction and fantasy group. The assumption of homogeneity of variances was tested and the conclusion drawn that no violation occurred. The t-test results illustrate that the mean gains of all groups were significant beyond the .001 level. An analysis of covariance, adjusting for pretest differences, revealed significance for the main effect of group treatment on posttest achievement as well as on retention test gain.

Discussion

The purpose of this study was to investigate the effect of three classroom teaching methods: programmed instruction, simulation and guided fantasy, on achievement. The treatments were purposefully designed to facilitate achievement. The results showed that significant gains in achievement were made by all groups including the control group. Also there were significant differences among groups.

In interpreting these results, several limitations must be considered. The population sampling was limited to 57 subjects from a southwestern Wyoming community. Generalizability is qualified by such sampling as there may be a cultural influence. The treatment may also have been influened by teacher attitude and effectiveness. The use of behavioral objectives in all treatment groups may have contributed to the achievement gain.

On the basis of the data presented, the following conclusion appears warranted: Each method — programmed instruction, simulation and guided fantasy — offers an alternative to teaching content information for achievement as well as for retention. Although these significant results may not be exclusively attributed to the treatment, they illustrate that these methods are likely to facilitate learning.

It is important for teachers to have alternative approaches in instruction available to them. If teachers attempt to individualize instruction and adapt instruction to students' styles of learning, they must have alternative strategies available. This study suggests that the methods of simulation, programmed instruction and guided fantasy can assist teachers in adding to their repertoire of instructional approaches. Teachers can choose from these methods without strong reservations regarding their effectiveness. Teachers can assume that any one of these approaches can facilitate student learning. The approaches then are not frills, fads nor untested. This study suggests that these methods can assist teachers' reaching their educational goals.

The limitations of this study lead to the following suggestions for further study in this area:

1. The effectiveness of these methods with different age levels, larger and geographically-different sample and different curricula needs to be investigated.
2. There is a need for further investigation of the influence of behavioral objectives on achievement apart from instructional methodologies.
3. Further comparative research of the effectiveness of methods purposefully designed to facilitate achievement should be conducted.

It is also suggested that further research be conducted to assess which methods are effective for particular outcomes and which methods are most effective for various learning styles. A variety of effective methods provides alternatives for deliberately teaching to the unique interests, needs and abilities of individuals and to attain mastery level learning. The degree to which behavioral objectives are clearly understood by the instructor and student; and the extent to which the presentation, explanation and ordering of the elements of the task to be learned approach the optimum for a given learner, determine the quality of instruction (Carroll, 1963). These methods, programmed instruction, simulation and guided fantasy, offer viable alternatives for teachers and students to obtain high level achievement through a systematic approach.

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L'efficacité des méthodes d'enseignement de trois classes: l'instruction programmée, la simulation et le rêve éveillé dirigé.

Cette étude a examiné l'efficacité de méthodes d'enseignement de trois classes: l'instruction programmée, la simulation et le rêve éveillé dirigé, en relation avec l'amélioration de la performance comme fonction de traitement d'une unité d'études sociales du grade quatre. Les traitements étaient délibérément conçus pour encourager l'accomplissement dans une unité d'études sociales. Les résultats révélèrent que des gains significatifs dans la performance avaient été enregistrés chez tous les groupes, y compris le groupe de contrôle. Des différences significatives apparaissaient également entre les groupes.

Die Wirksamkeit von drei Methoden des Klassenunterrichts: Programmiertes Lehren,, Nachahmung und gefürte Phantase.

Diese Arbeit befasst sich mit der Wirksamkeit von drei Methoden des Klassenunterrichts: Programmiertes Lehren, Nachahmung und geführte Phantasie. In einer Lehreinheit für Gemeinschaftskunde im vierten Schuljahr wurde Verbesserung in Beziehung zu dem Lernerfolg als Teil des Versuchs untersucht. Die Behandlungen wurden absichtlich geplant, um Erfolg in einer Gemeinschaftskundenlehrplaneinheit zu fördern. Die Resultaten zeigen, daß bedeutungsvolle Fortschritte in allen Gruppen, einschließlich der Kontrollgruppe, erreicht wurden. Es gab auch bedeutsame Unterschiede zwischen den Gruppen.

La efectividad de los tres métodas de enseñanza en el salón de clase: Instrucción programada, simulación y fantasía guiada.

Este estudio investigó la efectividad de los tres métodos de enseñanza en el salón de clase: instrucción programada, simulación y fantasía guiada en condiciones de mejoramiento en la obra como una función del tratemiento en uno unidad de estudios sociales en el nivel del cuarto grado. Los ejecución en una unidad de estudios sociales. Los resultados indicaron que logros significativos en la realización fueron obtenidos por todos los grupos incluyendo el grupo de control. Tambien hubieron diferencieas significativas entre los grupos.

J. of the Society for Accelerative Learning & Teaching, 1983,
8/1 & 2

Teaching Relaxation in School:
A Survey of Research and Empirical Studies*

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Abstract

The main aim of this project, which started in 1979, was to work out and evaluate simple relaxation techniques for school pupils. Apart from this major aim, several related questions were studied, such as: What short-term and/or long-term effects might a simple training program in relaxation achieve? Has relaxation any importance for recovery after physically-strenuous activity? A further and important aim of the project was to make a critical examination of previous research in the tension control area. This survey of research showed that much of the earlier scientific work had rather severe shortcomings in research methodology and design. Therefore some of the previous conclusions concerning the benefits of different techniques of tension control could not be regarded as being proved but must be confirmed by more controlled studies. One important result from the review of literature was that no single relaxation method showed to be more effective than the others. For that reason, various methods were combined in the final tape-recorded progams that were used in this study. The relaxation program started with an abridged version of progressive relaxation followed by some autogenic exercises and simple meditation techniques.

The main study could shortly be characterized as an experimental study in a natural milieu (the school) with one experimental group (N = 294) and one control group (N = 287). The pupils (12-17 years of age) in the experimental group received relaxation training two or three times a week during a six-week period. Measurements were done before, during and after the experimental period. Experience of relaxation training was measured on four different occasions. About 90% of the pupils found that relaxation was pleasant and positive. There proved to be a clear majority who thought that relaxation had worked and that they had learned to relax. Most of them were now able to relax themselves without assistance. Over 90% felt that it had been easy to learn to relax using the model they had tried. Some other results were that over half said that they managed their school work better and one third that they slept better. Sixty percent felt less stressed, 44% less irritated and 46% more rested and alert than earlier.

The results from the two physiological studies gave a clear picture of recovery from strenous activity on the bicycle ergometer. In the first recovery study, the differences between the experimental group and the control group as regards rate of breathing were significant at 1% level. With regard to the heart rate, no significant differences were noticeable between the two groups. The subjective experiences of rest and recovery were much stronger in the experimental group than in the control group. In the second recovery study, major significant differences between the groups were noted for the rate of breathing, whereas for variables such as blood pressure, heart rate and catecholamines in the plasma, there was a tendency towards a more rapid return to a normal state in the experimental group.

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Background.

In recent years, there has been a growing interest in different techniques of tension control in many fields, such as sport, education and medical treatment. In spite of this increased interest, it is remarkable that the amount of systematic research is very small in relation to the frequency which these techniques are used. This is particularly true with regard to research on children and adolescents, where very few studies have been carried out. The studies that have been conducted have generally had a clinical approach and have usually been based on very few subjects. The situation is similar with regard to studies in school, where systematic large-scale investigations (Jacobson and Lufkin, 1968; Angers, et al., 1975; Engelhardt, 1976) are virtually nonexistent. The lack of serious and well-documented research in the tension control area was one of the reasons why this project was started. Another, but quite different, reason was the feeling that learning different kinds of tension control techniques could be of great value for school pupils in our complex and often stressful modern society. A pilot study (Setterlind and Unestahl, 1977a) showed some promising results, which strengthened the belief that such methods could be helpful in a variety of situations both in school and in leisure time. An important task in today's schools ought to be to increase the pupils' health consciousness by means of sports and other kinds of physical activity, to teach them the value of a well-balanced diet, the danger of drugs, etc. These issues are usually emphasized in school curricula and other documents relating to the goals of education, but in Sweden, as in most other countries, the role of relaxation and other tension control techniques has been neglected.

The aim of the project.

The project, entitled "Techniques of Tension Control and Their Application in Educational Contexts," was started in 1979 and completed in 1983. It was financed by the Bank of Sweden's Tercenary Foundation. The aim was to work out and evaluate simple techniques of tension control for pupils in elementary school and high school. Apart from this major aim, there were several other questions to which, it was hoped, this project would provide answers, e.g.:

- What short-term and/or long-term effects might a simple training program in relaxation achieve?
- Does age and/or sex affect the way a pupil experiences and is affected by relaxation?
- Are there any differences in the way a pupil evincing a high degree of anxiety experiences and is affected by relaxation compared to one evincing a low degree of anxiety?
- What stress reduction effects might be experienced in connection with relaxation?
- What general effects might a period of basic training in relaxation have on school work and the situation outside school?
- Can training in relaxation affect body awareness and self-confidence?
- Is it possible to measure physiologically what happens to a child or adolescent during relaxation?
- Has relaxation any importance for recovery after physically-strenuous activity?

- Why don't all pupils experience tension control as something positive?
- What form should an effective relaxation program take and how should relaxation in school be planned?
- What training is necessary for teachers and others concerned with pupil welfare, with regard to the application of relaxation in school?
- What should be included in training programs for teachers learning relaxation methodology?

A further aim of the project was to attempt to survey and evaluate the more common tension control techniques, in order to create some order in the mass of techniques and concepts at present used in connection with relaxation and self-control. This part of the project is reported in part I of this book. The methods or techniques which were used in their entirety or in part in my investigation into tension control techniques were progressive relaxation, autogenic training and meditation.

The design of the project.

In the main investigation, approximately 300 pupils between the ages of 12 and 17 received relaxation training three times a week for six weeks during the autumn term of 1979. The relaxation program, which was recorded on tape, was practiced at the end of each physical education lesson. A schematic presentation of the main study is given in the diagram below:

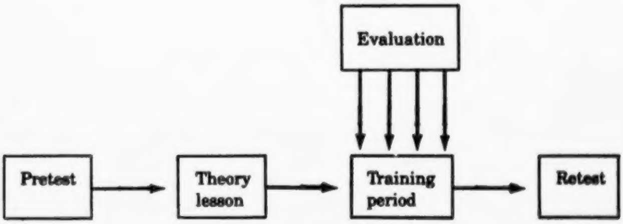

Figure 1. Schematic presentation of the main study.

In the first place, questionnaires were used to measure experiences, somatics and behavior. The physiological effects, both as regards relaxation and recovery after physical effort, were registered in a special study in the autumn of 1980. Further, a survey of the requirements for training and further training of teachers and other staff concerned with pupil welfare was made.

Main Study

The overall plan of the main study is shown below:

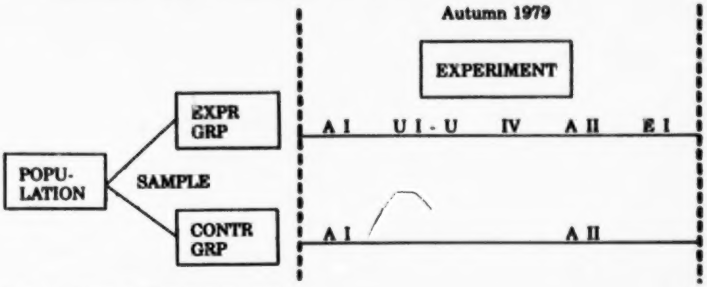

Fig. 2. Plan of the main study.

A = general questionnaire
U = questionnaire on experiences during relaxation session
E = questionnaire on more long-term results.

Questionnaire AI (pretest) consisted of 32 questions and was filled in during the week prior to the commencement of tension control training. At that time, the pupils did not know that a study would be carried out at their school. Both the control group and the experimental group answered the questions, which were intended to measure the following:

1. Previous experience of and motivation for relaxation.
2. Attitude to and experience of school.
3. Sport, exercise and smoking.
4. Worry, anxiety and psychosomatic problems.
5. Mood test.

Questionnaire AII (posttest) was identical to AI except for the fact that the questions on previous experience of and motivation for relaxation were deleted. This questionnaire was answered during the week after the completion of relaxation training. Together with questionnaire AI, it was the only one that was filled in by both the experimental and control groups. Questionnaire U was intended to provide a picture of the pupils' experiences while they were learning relaxation. The questions were answered immediately after the pupils had awakened after relaxation sessions on four different occasions during the six-week training period. Each questionnaire U included four types of questions:

1. General experiences of relaxation training.
2. Special experiences during relaxation.
3. Degree of physical and mental relaxation.
4. Mood test.

The final questionnaire (E) in the main study was handed out just before the Christmas holiday of 1979. The questions, a total of 26, were constructed to measure what the pupils got from relaxation training.

1. The experience of learning relaxation.
2. Views on the relaxation program.
3. Views on the design of relaxation training.
4. The effects they received from relaxation training.

Selection of schools and subjects.

One middle school (6th grade), two upper level schools (7th and 8th grades), and two high schools (1st and 2nd years) with a total of 294 pupils took part in the experiment; there were also 287 pupils in the control group. The distribution of the sexes was as follows: In the experimental group, 48% were boys and 52% girls, in the control group 52% boys and 48% girls.

Table 1

Distribution of pupils in the Main Study

Level	Experimental group (n)	Control group (n)
6	51	53
7	55	54
8	63	60
I	56	58
II	69	62
	294	287

Application of the techniques in school. In order to discover the most suitable method of teaching relaxation in school, I made a detailed study of various tension control techniques with regard to learning and effects (Part I in this book). As I was not able to find any comparative studies which provided evidence for the advantages of any one technique over another, I combined various methods of learning relaxation.

From a pedagogical point of view, I found that it was most suitable to commence with an abridged version of progressive relaxation, followed by a tension control program with some autogenic exercises such as heaviness and warmth. The pupils also learned to deepen relaxation and, further, to use simple meditation techniques of the type recommended by Benson (1975), the "Relaxation Response." The aim of the relaxation training in school was to allow the pupils to test various techniques in order to choose, at a later stage, the technique or combination of techniques that would suit them best. It was hoped that they would then be able to continue training on their own without the aid of a cassette or a teacher. The order, contents and length of the programs are described below:

1. Muscular relaxation	12 min	week 1
2. Muscular relaxation	8 min	week 2
3. Mental relaxation	10 min	week 3
4. Mental relaxation	8 min	
5. Conditioning by a signal	8 min	week 4
6. Testing of methods	8 min	
7. Choice of one's own method	8 min	week 5
8. Self-instruction	7 min	week 6

A model for learning relaxation.

As with all complex learning, it may be presumed that components from various theories of learning are important when learning relaxation. A comparison may be made with Gagne's (1970) hierarchic construction of the learning process. With reference to the above, learning relaxation can, therefore, be explained by means of a number of factors. My final theoretical model for learning consists of eight different phases, which include parts of different theories of learning. The phases are presented below:

Phase 1. Inform and motivate the pupils in a lesson before starting relaxation training in the physical education lessons.

Phase 2. Give experience of what relaxation is. (Programs 1 and 2)

Phase 3. Learning relaxation by conditioning processes. (Programs 1 and 2)

Phase 4. Passive concentration on certain muscles or groups of muscles gradually stimulates, after a period of training, a relaxation effect by means of the "reversed ideomotory tendency." (Programs 3 and 4)

Phase 5. Conditioning by a "trigger," a special signal, which rapidly stimulates the relaxation reaction. (Program 5)

Phase 6. Consciously test various techniques of relaxation and of deepened relaxation. (Program 6)

Phase 7. Individual choice of techniques. (Program 7)

Phase 8. Further independent training. (Program 8)

It is also possible to identify another phase, namely, generalization to other situations, but this is considered as lying outside the learning situation.

Some results of the main study.

The major aim of the study was to measure the subjective experiences and effects of relaxation training during a six-week period. A large battery of questions, which were intended to complement each other, was used to provide a complete picture. I did not use significance testing but preferred to describe the trends by calculating the percentage of change. Many researchers are skeptical of significance testing, particularly with field investigations of the survey type, since they cannot, then, test the data from an overview perspective. Furthermore, there is an obvious risk of type-2 errors (Galtung, 1967). The material from the various areas was instead, collected and totalled for analysis, even on the subgroup level, sex, school levels, and degree of anxiety. I was thus not concerned with the analysis of individual questions as much as with the mapping of tendencies during the learning of relaxation.

Since the material is so extensive, I shall merely give a survey of the results here, together with certain comments. The analysis of the material shows that the number of dropouts, both totally and on the subgroup level, was very small and should, thus, not affect the results.

Experience of relaxation training was measured on four different occasions in the experimental group, using questionnaire U. About 90% of the pupils found that on each occasion, relaxation was pleasant and positive. Over 80% thought it was very easy or fairly easy to relax. Only about 3% found it was difficult for them to relax. About 70% felt they were completely or almost completely relaxed on the first two occasions whereas there was a slight reduction on the next two occasions. The girls tended to be more positive than the boys on the first two occasions.

The experience of relaxation was measured by means of carefully tested questions immediately after the pupils had finished listening to the relaxation program and had sat up. Most of the pupils (80-90%) generally experienced calmness and rest on the first three occasions; on the final occasion, there was a slight reduction.

The pattern was more or less the same for all the experiences detailed in questionnaire U. Most of the experiences were concerned with bodily sensations, such as a feeling of heaviness, which an average of about 70% experienced to a high degree. Other bodily experiences and average values were: the release of various tensions (63%), a feeling of sinking (59%), warmth in various parts of the body (43%), various parts of the body became numb (41%), and lightness in the body (30%). About half the pupils experienced mental sensations, to a high degree, their surroundings disappeared, their mind became blank and they had difficulty in estimating the time they had been in a state of relaxation. About 50% felt tired when they woke up and as many felt very rested.

An analysis of the results for various subgroups reveals a slight tendency for boys, pupils in the upper level schools, and pupils evincing a high degree of anxiety to show positive development throughout.

Various methods of measuring the degree or depth of relaxation were tested. By noting all those who indicated throughout that they experienced the different variables to a high degree, I arrived at the following categorization of the pupils as regards depth of relaxation: about 25% experienced light relaxation, 50% medium and 25% deep.

The final measuring device on the questionnaire was a mood test, covering 11 positive emotional states and their opposites. The emotional states that were most relevant for the study received consistently high values. Thus, about 90% of the pupils felt assured, satisfied, happy, friendly, relaxed and calm immediately after relaxation exercises during the physical education lessons. These emotional states were more or less stable but, on the final occasion, there was a slight reduction in most of them.

Questionnaires AI and AII were used to measure the possible effects of relaxation in the experimental group as compared with the control group. The first questions concerned the pupils' attitude to and experience of school. Almost 60% thought that it was fun to go to school every day or at least 3-4 days per week. A little more than 30% thought that it was fun 2-3 days per week. Just under 25% wished they didn't have to go to school every morning or at least 3-4 days per week. About 15% experienced stress at school every day or at least 3-4 days per week. About 35% experienced this 1-2 days per week. The retest revealed some changes to the advantage of the experimental group. These changes are strengthened if an analysis is made on the subgroup level. It was particularly the boys in the experimental group that changed; they became more positive to school. Pupils at upper level schools and pupils evincing a high degree of anxiety were most negative to school but those in the experimental group revealed some positive change. The girls, pupils at the upper level schools and high schools, and those evincing a high degree of anxiety found school a greater stress situation than other groups did. The retest revealed more and greater changes in a positive direction for the experimental group than for the control group.

A number of questions in the tests were collected under the headings "Worry," 'Anxiety," and "Psychosomatic Problems." There seemed to be some difference between the groups in some questions right from the start. Thus, more pupils in the control group were calm, assured and not particularly nervous before examinations than in the experimental group. The retest revealed, however, that the pupils in the experimental group had more often changed in a positive direction while those in the control group hadn't experienced any change at all. On the subgroup level, the greatest changes were found in the girls, pupils in the middle school, and upper level schools, and those evincing a high degree of anxiety in the experimental group, as regards the questions on calmness, security, nervousness before examinations, uneasiness about being alone and about going to the dentist, and satisfaction or dissatisfaction with themselves.

As regards the questions on psychosomatic problem, however, the changes were very small and went in both directions. This was the only point in this study where the trend was not quite clear. It is difficult to give any definite reasons for this. Probably the instruments for testing were not sensitive enough.

The mood test seemed to be a sensitive measuring device for detecting changes in emotional states before and after the test period in school. In general, it may be stated that there were many positive changes in the experimental group and many of them were relatively large in comparison with the control group. The total percentage of change in the 22 variables was almost three times as great for the experimental group as for the control group (159 to 58). The eight most relevant emotional states for the study were combined in order to calculate the percentage of change for the subgroups. These emotional states were: relaxed, tense, unstressed, stressed, alert, tired, self-assured and shy.

A short summary of the results of the mood test shows that the girls, high school pupils and those evincing a high degree of anxiety in the experimental group changed most from the pretest to the retest. The total percentage of positive change for the three subgroups in the experimental group was 645 and for the control group 184. To this must be added 106 percentage of negative change for the control group as against 0 for the experimental group.

When the experiment was over, the pupils were asked to answer questionnaire E, which dealt with their experience of the relaxation programs and of the way the training was carried out. There proved to be a clear majority who thought that relaxation had worked and that they had learned to relax. Fifty-six percent were absolutely convinced of this while 1% didn't at all feel that they had learned to relax. Most of them were now able to relax themselves without assistance. Only 1% considered that they couldn't manage this. Almost half stated they had definitely found it useful to be able to relax. About 25 pupils or 10% didn't want to continue with relaxation training during the spring term.

One-third of the pupils in the experimental group thought that relaxation training had been of great value and 8% considered it worthless. Over 90% felt that it had been easy to learn to relax using the model they had tried. Just over half of the pupils had been positive to relaxation exercises from the beginning and still were, while over 40% had become more positive. Seven percent were negative to tension control exercises.

Finally, the pupils in the experimental group were asked to answer questions about what they thought had been improved or worsened by the six-week relaxation training. Some of the noteworthy results were that over half said that they managed their school work better and one-third slept better, 60% felt less stressed, 44% less irritated and 46% more rested and alert than previously. Many pupils (24%) felt it was easier for them to learn things in school.

The experiment with relaxation training in school seems to have been very successful if one takes the results of the pretest and retest into account. However, certain reservations concerning the measuring techniques should be made. As the sample of subjects in the experimental group and control group was not entirely random, but was regulated by organizational and timetable considerations, regression effects pose a threat to unambiguous results (Stukat, 1970). These effects are, however, most noticeable when the individuals are taken from extreme groups and when it is a question of one-group experiments. In this study, it should be the group of pupils evincing a high or a low degree of anxiety that are most exposed to regression effects, as these groups were made up of the approximately 15% who evinced the highest or the lowest degree of anxiety according to the criteria used in this study. There is also a risk in studies like this that the individuals distributed nonrandomly differ with regard to spontaneous individual changes.

In all experimental field studies where new methods are tested, irrelevant environmental influence is always present because of, for example, the special attention the experimental group receives. This so-called "Hawthorne effect" is expressed in the form of positive change. Another source of error is the effect of expectation and suggestion unconsciously conveyed by the teachers involved. To avoid these sources of error, the individuals in the control group should receive the same attention as the experimental group or a similar treatment with a neutral content, the so-called placebo. In the pilot study mentioned earlier (Setterlind and Unestahl, 1977a), such a method study was carried out; the pupils in the control group were asked to lie down on the floor and close their eyes, but they received no stimulus. They soon got bored and were not interested in participating in the program for the full length of the experiment. Just over 40% were satisfied with this training, as compared to 90% in the experimental group who listened to the relaxation program on tape. I did not, therefore, find it meaningful to use a placebo control group in this extensive study because of the risk that the pupils would not want to complete the experiment. The control group did, however, receive some "treatment" since they took part in the same physical education program with the exception of the relaxation training. It may also be said that many in the experimental group thought that this training took too long.

Disburbances in the measuring process may also have influenced the influenced the result. It appears that there was a tendency for many pupils to get tired with the many tests while they were learning relaxation. They were, in particular, negative to the last test, something that was confirmed in the interviews with pupils and teachers. It seems that the pupils in the middle school were especially sensitive to this. The results also suggest that the various age groups experienced relaxation differently. Thus, the middle school pupils were most positive to muscular relaxation but they were less interested in the programs where the pupils started tension control and trained on their own. Upper level pupils and, in particular, pupils in the high schools were positive throughout the period of learning and were especially interested in the mental and meditative programs.

When interpreting the results in the groups evincing a high or low degree of anxiety, one should note that the girls were over-represented in the high anxiety group (63%) and the boys in the low anxiety (62%). It is, therefore, probable that there was some interaction with sex division at least at the beginning when the girls were more motivated and felt that they learned more quickly.

It is not likely that these sources of error are the only explanation of all the major changes to the advantage of the experimental group. Some of the changes that took place can possibly be explained by an artificial flexibility in the material, but such great and systematic changes as those found must suggest real changes as a result of relaxation training. Furthermore, if fewer measurement had been taken during the period of learning, the results would probably have been more positive.

Physiological studies.

The aim of the special studies, which were carried out in the middle of the autumn term of 1980, was to register the recovery phase in a group of 14-15-year old pupils after strenuous activity on a bicycle ergometer. A comparison was made between the experimental group which had trained relaxation over a five-week period, and a control group which hadn't received any relaxation training. One study covered 40 pupils (recovery study I) and the other 20 (recovery study II). Some of the questions raised in connection with these studies were:

- Is it possible to measure, by physiological methods, what happens to children and adolescents during relaxation and rest?
- Is it possible to establish any differences in effects and experiences between the experimental group's relaxation and the control group's rest?
- Has relaxation any significance for the feeling of recovery after physically strenuous activity in children and adolescents?

In an attempt to find answers to these questions, a test battery consisting basically of physiological, but also of psychological measuring devices was used.

The studies were carried out with 8th grade pupils. They were from the same group that had taken part in the main study during the year 1979-80, when they were in the 7th grade. In the middle of October, all the pupils in the 8th grade (98 altogether) underwent a sub-maximum work test on a bicycle ergometer to calculate their ability to absorb oxygen (Astrand and Rodahl, 1970). With the aid of the test values and the weight of the individuals, twenty pairs of pupils were matched; ten pairs of girls and ten pairs of boys, thus forming an experimental group and a control group.

In the next week, the matched pairs were submitted to two pretests consisting of four minutes' warm-up on a normally-loaded bicycle ergometer and then ten minutes' work at 80% of the calculated maximum ability to absorb oxygen. Before the testing began, the pupils had lain down and rested for four minutes while their pulse rate at rest was noted. While they worked on the bicycle ergometer, the pupils' heart rate was continuously monitored by a cardiometer. After five and ten minues, the pupils made a subjective assessment of their exertion (Borg, 1973). The load was on average about 790 kpm in both the pretest and retest for both the experimental group and control group. In the pretest, the load varied between 600 and 1050 kpm and in the retest between 600 and 900 kpm.

After ten minutes' work on the bicycle ergometer, the pupils lay down on mats to rest for ten minutes. Their heart rate was measured after 1, 3, 5, 7, 8, 9 and 10 minutes. Their rate of respiration was also measured after 4, 6, 8 and 10 minutes. The rate of breathing was measured with the help of a piece of paper that was folded and placed on the chest of the subject, and its movement was counted over a period of 60 seconds. Immediately after their ten-minute rest, the pupils were asked to complete a "rest test" where they were asked about their state of rest and recovery.

During the following five weeks (44-48), the ten boys and ten girls in the experimental group were urged to practice relaxation at home five times per week. They were instructed by the project leader how they should train with the structured programs used during the autumn term of 1979. These were recorded on a cassette so that they could use them at home. They also received a simple record card to be filled in after each training session. This consisted of three simple questions about the frequency and the experience of physical and mental relaxation.

The following week, two retests were carried out and during these the pupils in the experimental group consciously applied their relaxation technique while resting. Otherwise, the test took place under the same controlled conditions as in the pretest.

A further special study was carried out in the following week, recovery study II, on five boys and five girls from both the experimental group and the control group. The criteria for the selection of these matched pairs were that the pupils had to have taken part in all the tests during both the pretest and retest so that there would be no dropout in the matched pairs.

The reason why two pretests and retests were made in the same week with a day between them was to provide as reliable results as possible and to remove all potential sources of error, such as mistakes in measurement and variations in form. In the presentation of the results, the mean values for the two test occasions will be used throughout.

Recovery study II was carried out at the pupils' own school in the same way as the pretests and retests with the larger group, but this time blood pressure and blood tests were also taken. Before the pupils started work on the bicycle ergometer, a blood test at rest was taken; then a test was taken during the last minute's work and again on four occasions during the ten-minute rest period. The blood tests were taken from a vein catheter placed in the bend of the arm 10-15 minutes prior to the start of the experiment. The blood pressure was registered by an indirect method (sleeve and auscultation) at rest, just before the work was completed and again on four occasions during the rest period. As before, the pupils were asked to give a subjective assessment of their exertion after five and ten minutes' work on the ergometer, and after the rest period, assess their degree of recovery.

The blood tests were taken for later analysis of lactic acid (Lowry and Passonneau, 1973), adrenaline and noradrenaline (Christensen, 1973). The blood samples were centrifuged immediately after the experiments and the plasma kept at -80° C until analyzed. Catecholamine analyses were made on a limited number of pupils (five boys and five girls) from the experimental group and the control group. As in the previous study, the heart rate was determined with a cardiometer and the rate of respiration counted over a period of 60 seconds.

Results of the physiological studies.

The results from both the special studies give a clear picture of recovery from strenuous physical activity on the bicycle ergometer. In recovery study I, the differences between the experimental group and the control group as regards rate of respiration were significant at the 1% level. Even at the pretest stage, the test group's rate of breathing was considerably lower than that of the control group. A probable explanation for this is that the pupils in the experimental group took part in the experiment in relaxation training the previous year. The result of the pretest is therefore an indication that learning relaxation was successful, even in a long-term perspective. In spite of this, the experimental group lowered their rate of breathing further and even more than the control group. With regard to the heart rate, the tendencies were clear, but in contrast to the rate of breathing, no significant differences of rest and recovery were much stronger in the experimental group than in the control group.

Even in recovery study II, the picture was relatively uniform. During recovery, major significant differences between the groups were only noted for the rate of respiration whereas for the variables such as blood pressure, heart rate and catecholamines in the plasma, there was a slight tendency towards a more rapid return to normal in the experimental group. Even if the group mean values only showed small differences, there were some individual cases in the experimental group where the return to normal for all the relevant variables was more pronounced, as can be seen from the greater deviations around the mean values.

The clear difference in rate of respiration with a more rapid return to normal in the experimental group is linked to the fact that breathing is more easily influenced by the will and that relaxation training focuses on breathing. The subjects worked on similarly-loaded ergometers. Mechanical effects showed only small individual variations, so it can be assumed that both oxygen consumption and ventilation were the same for both groups at the commencement of the work, about 50 1/min. It is not likely that the resting level for ventilation was achieved in either group during the ten-minute rest period. This conclusion is also supported by the fact that the lactic acid concentration in the blood was heightened after the ten-minute rest. This means that the experimental group probably compensated for their low rate of respiration with a slightly greater volume per breath. Alveolar ventilation was therefore greater, which could lead to somewhat better conditions for gas exchange. It is more difficult to assess to what degree the deeper breathing helped to explain the differences in the reduction of the heart rate.

The identical reduction of catecholomines suggests that the dampening of sympathetic activity after work was the same in both groups. The somewhat lower heart rate in the experimental group was, however, connected with a somewhat more powerful parasympathetic activity. In this connection, it can be noted that vagus activity is primarily significant for frequencies under 120-130 beats per minute. It was also here that the small differences between the groups was most obvious.

In spite of a more extensive and disturbing measuring procedure in recovery study II than in recovery study I, many of the pupils in the experimental group found no difficulty in resting and they felt rested afterwards. The pupils in the control group did not feel anything nearly as recovered afterwards and thus thought it was more difficult to rest.

The conclusion is that most of the results show that relaxation training seems to have a certain physiological effect but in particular, a psychological effect with regard to the feeling of rest and recovery.

Conclusion.

An important task in today's school is to make the pupils more aware of their health. This can be done by increasing their awareness of their body and its possibilities. This includes teaching them to listen to their own body and to be sensitive to its signals. The delicate interplay between mental and physical factors is easily disturbed and disturbances in the form of acute or chronic stress can lead to ill health. However, not enough information is given about the various methods of preventing and dealing with the stress and overstimulation to which our complicated and easily-disturbed nervous system is exposed in today's society. Relaxation could be included under the heading "mental prophylaxis" and could play an important part in a holistic health care perspective.

L'ensiegnement de la relaxation à l'école: une enquête des recherches et des études empiriques.

Le principal but de ce projet, qui commença en 1979, était de découvrir et d'évaluer de simples techniques de relaxation pour les élèves. En dehors de ce but principal, plusieurs questions se rapportant au sujet furent examinées telles que, par exemple: Quels sont à court terme et à long terme les effets que peuvent avoir un simple programme de relaxation: La relaxation joue-t-elle un rôle quelconque dans la récupération après une activité physique nécessitant beaucoup d'efforts? Un autre but plus important du projet était de faire un examen critique des recherches antérieures dans le domaine du contrôle de la tension. Cette étude des recherches a révélé que la plupart des travaux scientifiques and antérieurs dénonçaient plutôt de sérieux défauts dans leur méthode de recherche et de conception. Il en rfsulte donc que certaines des conclusions antérierues au sujet des bienfaits des différentes techniques du contrôle de la tension ne pourront être prises enconsidération et en outre ces bienfaits devront êtres confirmés par des études plus contrôlées. Le passage en revue des documents eut pour conséquence de signaler qu'aucune méthode de relaxation n'est plus efficace qu'une autre. C'est pour cette raison que différentes méthodes furent enregistrées dans les programmes finals qui frent utilisés dans cette étude. Le programme de relaxation commença avec une version abrégée de relaxation progressive suivi de certains exercices autogéniques et de simples techniques de méditation.

La principale étude pourrait être brévement caractérisée comme étant une étude expérimentale d'un milieu naturel (l'école), de celle d'un groupe expérimental (N=294) et de celle d'un groupe de contrôle (N=287). Les élèves (de 12 à 17 ans) du groupe expérimental subirent un entrainement de relaxation à raison de deux à trois séances par semaine pendant une durée de six semaines. Les mesures ont été prises avant, pendant et après la période expérimentale. L'expérience de l'entrainement de relaxation fut mesurée à quatre reprises différentes. A peu prè 90% des élèves trouvèrent la relaxation agréable et positive. Cela prouve donc qu'une majorité bien nette semble penser que la relaxation a réussi et qu'ils ont appris à se détendre sans l'aide de quiconque. Plus de 90% ressentirent qu'il était facile d'apprendre à se détendre en copiant le modèle qu'ils avaient essayé. D'autres résultats montrèrent que plus de la moitié des élèves arrivaient à mieux faire leurs devoirs et qu'un tiers d'entre eux dormaient mieux. 60% se sentaient moins tendus, 44% moins irrités et 46% plus reposés et plus alertes qu'avant.

Les résultats des deux études physiologiques donnèrent une image bien nette de la récupération après un effort éprouvant à l'aide d'un ergomètre placé sur une bicyclette. Dans la première étude de récupération, les difféerences entre le groupe expérimental et le groupe de contrôle était de 1% en ce qui concerne le taux de respiration. En

ce qui concerne le taux du coeur aucune différence significative ne fut notée. Les expériences subjectives de repos et de récupération étaient plus importantes dans le groupe expérimental que dans le groupe en ce qui concerne le taux de respiration, alors que pour les variables telles que la tension, le taux du coeur et des catcholamines dans le plasma, la tendance soulignait un retour plus rapide à la normale pour le groupe expérimental.

Die Estspannungslehre in den Schulen: Eine eingehende Prüfung der Forschung und der empirischen Arbeiten.

Dieses Projekt, das 1979 angefangen wurde, hatte als Hauptziel das Ausarbeiten und die Bewertung von einfachen Entspannungsverfahren für Schüler. Dazu wurden einige verwandte Fragen eingehend untersucht, wie z.B.: Was für kurzfristige und/oder langfristige Wirkungen könnte ein einfraches Ausbildungsprogramm für Entspannung erreichen? Hat Entspannung irgenwelche Bedeutung für die Erholung nach physisch anstrengender Aktivität? Noch ein weiteres und ebenso wichtiges Ziel war eine kritische Überprüfung vorherbehenden Forschens im Bereich der Spannungskontrolle. Diese eingehende Prüfung zeigte, daß die frühere Forschungsmethodologie und -planung oft ernsthafte Fehler enthält. Daher sind einige der Beschlüsse, die mit den Vorteilen verschiedener Verfahren von Spannungskontrolle zu tun haben, nicht als erprobt angenommen werden konnten, sondern, daß sie durch kontrolliertere Arbeiten unterstützt werden müssen. Ein wichtiges Resultat, das aus der eingehenden Prüfung der Literature kam, war, daß nicht eine der Entspannungsmethoden sich als effektiver als die anderen zeigte. Aus diesem Grund wurden die verschiedenen Methoden in den in dieser Arbeit benutzten auf Tonband aufgenommenen Programmen zusammengebracht. Das Entspannungsprogramm fing mit einer verkürzten Form von progressiver Entspannung an, worauf einige autogenische Übungen und einfache Meditationsverfahren folgen.

Die Hauptarbeit könnte man kurz als eine experimentelle Forschung in einem natürlichen Milieu (der Schule) mit einer Versuchsgruppe (N=294) und einer Kontrollgruppe (N=287) charakterisieren. Die Schüler (12-17 Jahre alt) in der Versuchsgruppe erhielten während einer Periode von 6 Wochen Entspannungstraining zwei bis drei Mal in der Woche. Vor, während und nach der experimentellen Periode wurden Vermessungen aufgenommen. Die Erfahrung von Vermessungen aufgenommen. Die Erfahrung von Entspannungstraining wurde vier verschiedene Male gemessen. Ungefähr 90% der Schüler fanden Entspannung angenehm und positiv. Es stellte sich heraus, daß eine klare Mehreit dachten, daß Entspannung effektiv gewesen war, und daß sie galernt hatten, sich zu entspannen. Die meisten waren jetzt ohne Hilfe fähig, sich zu entspannen. Über 90% fanden, daß es einfach gewesen war, sich mit dem versuchten Modell zu entspannen. Andere Resultate, die von über die Hälfte erwähnt wurden, zeigten, daß ein Drittel besser nachts schlief. Sechzig Prozent fühlten sich weniger gespannt, 44% seltener verärgert, und 46% ausgeruhter und lebhafter als fräer.

Die Resultate der zwei physiologischen Arbeiten gaben ein klares Bild der Erholung von anstrengender Aktivitä auf dem Radergometer. Bei dem ersten Erholungsversuch waren die Unterschiede zwischen der Versuchs- un der Kontrollgruppe in Bezug auf Atmengeschwindigkeit signifikant bis zur 1% Sicherheitsgrenze. In Beziehung Herzschlaggeschwindigkeit waren keine signifikanten Unterschiede zwischen den zwei Gruppen zu erkennen. Die subjektiven Erfahrungen von Ausruhen und Erholung waren viel stärker in der Versuchsgruppe als in der Kontrollgruppe. In dem zweiten Erholungsversuch wurden wichtige signifikante Underschiede in Erholungsversuch wurden wichtige signifikante Unterschiede in Atmengeschwindigkeit zwischen den Gruppen gefunden, während es für solche Variablen wie Blutdruck, Herzschlaggeschwindigkeit und Catechin in dem Plasma ein Tendenz in der Versuchsgruppe zu einem schnelleren Wiederkehr zur normalen Lage gab.

Enseñanza de la relajación en la escuela: Un reconocimiento de la investigación y estudios empíricos.

El objeto principal de este proyecto, el cual comenzó en 1979, fue trabajar arduamente y evaluar técnicas sencillas de relajación para (pupilos) estudiantes escolares. Aparte de lo anterior, muchas preguntas relacionadas fueron estudiados, tales como: Qué efectos a corto o largo plazo tendría un sencillo programa de entrenamiento en la ejecución de la relajación? Tiene la relajación alguna importancia para recobrarse después de la actividad físicamente vigorosa? Un ulterior e importante propósito del proyecto fue hacer un examen crítico de investigación previa en el area de control de tensión. Este reconocimiento investigativo mostró que la mayor parte del trabajo científico anterior, tuvo más bién severas deficiencias en la investigación metodológica y diseño. Por lo tanto, algunos de las conclusiones previas, control de tensión, no pudieron ser observadas ni comprobadas pero confirmados por más estudios controlados. Un importante resultado del repaso de la literatura (los escritos) fue que ninguno de los métodos de relajación mostrados, es por si solo más efectivo que los otros. Por esta razón, varios métodos fueron combinados en los programas finales grabados y usados en este estudio. El programa de relajación comenzó con una versión abreviada de la relajación progresiva, seguida de algunos ejercicios autogenicos 6 ténicas simples de meditación.

El estudio principal podría ser cortamente caracterizado como un estudio experimental en un sitio natural (la escuela) con un grupo experimental (N=294) y un grupo de control (N=287). Los alumnos (12-17 años de edad) en el grupo experimental, recibiendo adiestramiento de relajación dos o tres veces por semana durante un periodo de seis semanas. Medidas fueron tomadas antes, durante y después del periodo experimental. La experiencia de entranamiento de relajación fue medida en cuatro ocasiones diferentes. Alrededor del 90% de los alumnos encontraron la relajación placentera y positiva. Como consecuencia de lo anterior la gran mayoría (90%) comprobó la efectividad de la relajación y también aprendió a relajarse sin ninguna asistencia y usando un método fácil. Otros resultados se reflejaron en un major rendemiento en el trabajo de la escuela según lo comprobó más de la mitad. Una tercera parte de los asistentes pudieron dormir mejor. El 60% sintieron menos tensión, el 44% con menos irritación y el 46% más descansados 6 también más activos que anteriormente.

Los resultados de los dos estudios sicológicos dan una clara imágen de revindicación de una enérgica actividad sobre la bicicleta ergometer. En el primer estudio de recuperación las diferencias entre el grupo experimental y el grupo de control con respecto al curso de la respiración fueron significativas en un nivel del 1%. Al considerar los pulsaciones del corazón, no fueron notadas diferencias significativas entre los dos grupos. Las experiencias subjectivas del resto y la recuperación fueron más fuertes en el grupo experimental que en el grupo de control. En el segundo estudio de recuperación, fueron notadas más diferencias significativas entre los dos grupos en el curso de la respiración, mientras que en variables como presión de la sangre, pulsaciones del corazón y catecholamines en el plasma, hubo una tendencia hacia un más rápido retorno a la normalidad en el grupo experimental.

J. of the Society for Accelerative Learning & Teaching, 1983,
8/1 & 2

Socio-Cultural Environments and Suggestopedia*

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Abstract

An investigation was made into the theoretical bases of suggestopedia — the principle of authority, psychological "weakening" of the student, collective growth vs. individual achievement, intuitive learning and the hypnotic element of heterosuggestion — within the context of contrasting socio-cultural environments: communist and capitalist systems.

Introduction

The advent of Lozanov's suggestopedia has stimulated worldwide attention to devising teaching strategies to accelerate learning. Lozanov is singled out and cited so frequently because he is the one theoretician who has consistently tested his hypotheses, continually modifying and refining his method. Because of this, the seminal work of Lozanov cannot be ignored in developing any accelerated learning program. However, there is more than one technique for accelerating learning, and suggestopedia cannot be taken for gospel. In fact, apart from the Canadian government programs, fidelity to Lozanov's approach is not characteristic of Western experimentation on suggestopedia. Some researchers have departed so completely from the Bulgarian development that their teaching models cannot be considered suggestopedic. This infidelity to Lozanov's outline of suggestopedia is often blamed for the disparity between the spectacular results claimed by the Soviet Block and much more modest improvement in learning and retention demonstrated in American experiments. In other words, teaching rituals rather than the underlying philosophy of suggestology are considered at fault.

If, on the other hand, one were to examine the theoretical model of the approach as it was developed by Lozanov and other East European methodologists, one could perhaps begin to evaluate suggestopedia in terms of its applicability to noncommunist environments. The model which remains constant in spite of ever-changing teaching strategies is referred to by Lozanov as a set of "attitudes," inherent to socio-cultural behavior common to the Soviet Block countries. These attitudes include a built-in obedience reflex, acceptance of authority, lack of competitiveness, promotion of collective growth and a noncritical attitude. Lozanov's theoretical basis also includes an unquestionable acceptance of information promulgated by the government or by any recognized authority, such as a mentor/teacher on any given subject, e.g., the superiority of intuitive over cognitive learning and/or the importance of heterosuggestion in generating hypermnesia.

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* A paper presented at the First International Symposium on Accelerated Learning, State University of Rio de Janeiro, Rio de Janeiro, Brazil, January 17, 1983.

The purpose of this paper is (a) to catalog accelerated learning techniques used in the Soviet Block; (b) to examine the theoretical foundation of Lozanov's suggestopedia and its applicability (if any) to noncommunist environments; and (c) to offer a position on the probability of the method's success in the West, with some of the pedagogical variables either omitted or modified. Both the theoretical and applied components of suggestopedia will be discussed against the background of Western attitudes toward the individual within society.

Types of Accelerated Learning

Suggestopedia is only one of several accelerated-learning techniques which may include learning under hypnosis, through genetic manipulation or mechanical brain stimulation, in response to either pleasure or pain or any other strong emotion, or through a combination of various accelerative techniques.

Mira Vaisburg (1981) of the Soviet Academy of Pedagogical Sciences, lists four accelerated learning modes used in the Soviet Block in an article entitled *High Speed Language Learning*.

Hypnopaedia or teaching during natural sleep. The lesson, which is first presented in a regular forty-five minute class, is placed on tape. The student listens to the tape for fifteen minutes before falling asleep; he continues to hear it for another fifty-five minutes, played progressively softer. Some thirty minutes before the morning alarm rings, the tape begins to replay the lesson, getting progressively louder.

Rhythmopaedia, or teaching during induced sleep, in a classroom or a laboratory equipped with an electrohypnotic apparatus. Information is imparted by varying degrees of frequency of light and sound impulses (rotating circles, flashing lights, fluctuating sounds), in order to maintain, according to Vaisburg, the depth and intensity of hypnotic inhibition in the student.

Suggestopaedia, or teaching while the students are awake, imparting information to persons in a state of mental relaxation achieved through various means, such as baroque music, yoga breathing, visualization, muscular relaxation, and desuggestive-suggestive behavior of the teacher (which may include hypnotic intoning of suggestions during the passive concert phase and fluctuations in pace and volume in dialogue presentations referred to by Lozanov as "horizontal" and "vertical" swings.

Relaxopaedia or teaching while the students are awake, imparting information to persons in a state of relaxation (pseudopassiveness) achieved through the same means as those used in suggestopaedia minus heterosuggestion.

All four modes of learning, according to Vaisburg, trigger more selective attention and inhibit sensory perceptions not pertinent to the information presented during this particular instructional phase.

Since the term "suggestopedia" is used much more often than the other three terms by those interested in accelerated instruction, it is reasonable to assume that some Western educators indeed believe they are using suggestopedia, although with some modifications. In reality, more often than not, they simply (and happily) apply the term "suggestopedia" to the most innocuous methodology of the four listed above, namely that of relaxopedia, or a variation of relaxopedia.

Suggestopedia as an Attitude

Let us examine suggestopedia's theoretical basis as it was developed by Lozanov. Suggestopedia is not a technique, maintains Lozanov, but rather an attitude (Lozanov's statement does not deny the importance of certain teaching strategies; it emphasizes the importance of the underlying theoretical construct of the method). According to Lozanov (1973), the student in a suggestopedic class must display the following behavior. He must:

1. become "weakened" psychologically in order to develop trust in his mentor and accept his authority.
2. become amenable to suggestions (as result of his weakening);
3. accept rigid discipline (presumably in and out of the classroom), and
4. contribute continuously to the collective growth of the class rather than "harmfully" competing with his peers.

None of the preceding attitudes is stressed in the West because they are not what Western educators consider appropriate in our culture. Let us examine these attitudes one by one.

The principle of authority and heterosuggestion are predominant in suggestopedia. The student is said to be "desuggested" of his inhibitions (or reprogrammed) by his instructor/mentor who utilizes every possible device to relax the student mentally so that he becomes amenable to incoming suggestions. Then the instructor projects into the student's mind, either by direct commands or subtle suggestions, the following ideas:

1. The teacher is the supreme authority on the subject under investigation.
2. The subject is valuable and/or useful.
3. The student can and will learn effortlessly and retain new information for a long period of time.

Western attempts to accelerate learning have stressed only one type of teacher authority: that which comes from "within." This kind of authority is based on the teacher's mastery of subject matter, and the acknowledgement of this mastery by his students. It is a very important part of Lozanov's suggestopedia, but only a part. Another type of authority is that of the position or rank of the instructor who, according to Lozanov, is "never wrong." His word is final; he is not questioned by his students, let alone challenged. He remains aloof and formal outside of the classroom, although during socio-dramas, he may be "the life of the party." This is the authority which comes from "above." Obviously, it is effective since it has survived the rigor of testing and remains today one of the theoretical components of Lozanov's system. Furthermore, it does not conflict with the communist way of life. In fact, it reinforces it.

Suggestology cannot be either researched or applied in a vacuum. Delores Schaefer reports in *My Experiences with the Lozanov Method* (1980), that it is Lozanov's contention that suggestology's aim is to study the human personality in its interrelations with the environment. Thus, it is natural to infer that Lozanov was working within the context of his own socialist environment.

In the Soviet Block where regimentation, obedience and almost blind belief in authority are common and where mass media is maintaining the desired political climate rather successfully, the authority figure who orders modifications of student behavior is normally accepted. After all, people are conditioned to accept suggestions on all strata of their social milieu. In other words, susceptibility to suggestion is an integral part of Soviet societal behavior. A. G. Kovalev of the Leningrad State Institute of Culture, writes in *An Experiment in Reshaping the Personality of a High School Student* (1976), that "...habitual acceptance of the authority of his elders helps the student to accept their suggestions." (p. 240)

Another researcher, D. Lehman (1973), of Karl Marz Institute in Leipzig, East Germany, does not fail to establish a relationship between the method and the socio-political system of the Soviet Block by concluding that suggestopedia makes better Soviet citizens.

N. Shipkovensky, in *Limits and Dangers of Suggestions* (1975), contends that suggestions will be inhibited by an individual with a higher degree of mental development, creative ability and individualism. This is an indirect way to equate the success of suggestopedia with the absence of individualism.

The attitudes discussed above are incompatible with the sociocultural environments prevalent in our classrooms. The concept of authority (as the Soviet educators view it), heterosuggestion and above all, the concept of personality reshaping, do not sit well with Western educational tradition. A great deal of resistance could be expected if we were to introduce unexpurgated suggestopedia from the Soviet Block into classrooms in Western countries. Moreover, if we were to accept Shipkovensky's point of view, the individualism that characterizes the free world might preclude, or at least hamper, automatic acceptance of heterosuggestion from any figure of authority, thereby inhibiting the effectiveness of learning under suggestion.

It should be mentioned at this point that throughout the years, Lozanov has been modifying his techniques, confusing and annoying his followers in the process. Some have felt that these changes have been prompted by Lozanov's search for more productive classroom techniques, hence, modifications in class time, materials and their sequence of presentation, musical selections, classroom environment, breathing techniques, and so forth. Yet, Lozanov's theoretical basis, his 'attitudes," have remained pretty much constant although one could argue that he has been, and still is, searching for a better balance between desired results and means used to obtain them. In other words, "How much acceleration and at what price?"

Lozanov's perception of the collective growth of the class as an essential principle of suggestopedia may or may not receive wholehearted approval in the West. Earl Stevick of the US Foreign Service Language Institute in his *Teaching Languages: A Way and Ways* (1980), advances his view of an American language classroom as being an "arena" where individuals meet and fight for supremacy, for their own psychological survivals, for their own universes held together by deeply-ingrained cultural concepts, rules of speech and learning styles. From the onset, says Stevick, the psychological mood of such a classroom is not conducive to pleasant learning.

The concern with the collective growth of the class rather than with that of the individual may be viewed as a positive philosophy if its application diminishes exaggerated self-concern and its corollaries, self-pity, the feeling of inadequacy and of not being in control. Lozanov's collective growth could be compared to the Western concept of "team-work," which has been acclaimed by Western societies as a positive outcome of group behavior.

Finally, whereas Lozanov advocates avoidance of competition which he considers harmful, Western educators encourage competition in games, spelling bees, posters, projects and other activities. In fact, competition is one of the basic tenets of the capitalist system, and classroom instruction is not exempt from its influence.

On the basis of the four attitudes prescribed by Lozanov for a suggestopedic class, one should be able to perceive the image of an ideal East European suggestopedic student whose psychological strength is weakened to make him receptive to heterosuggestions, and who unselfishly contributes to the growth of his class and dutifully resists being competitive.

Does this image fit an American student as we know him today? Hardly. Does an approach based on these attitudes fit in our educational philosophy? Not on a wide scale, although it might prove useful and appropriate for a group of consenting adults who must, at all cost, master a large body of knowledge in the shortest span of time possible.

The Hypnotic Variable

Although this paper does not propose to resolve the ongoing dispute whether suggestopedia and hypnosis induce essentially the same altered state of consciousness, it will touch on certain aspects of this controversy.

Evidence indicates a similarity of the two consciousness states. For example, C. T. Tart defines light hypnosis in *Altered States of Consciousness* (1969), as a relaxed state of wakefulness, accompanied by receptivity to suggestion, with alpha brain waves as the dominant electrical pattern. Moreover, his study establishes a direct relationship between the light hypnotic state and intellective alertness and hypermnesia which characterize suggestopedia. Descriptions of the suggestopedic state found throughout Lozanov's works parallel closely the observations recorded by Tart in his studies of hypnosis.

Stanton (1978), confirms the similarity between hypnosis and suggestopedia by comparing hypnotherapy procedures with the three phases of the suggestopedic teaching presentation.

1. The preparation phase. The student/patient is being prepared for positive expectancy with mental and physical relaxation, rhythmic breathing and visualization of pleasant experiences.
2. The presentation phase. This is characterized by concentration of the student/patient on nonrelated objects, e.g., music in suggestopedia or backward counting in hypnotherapy.
3. The practice phase. Lozanov's sociodramas are similar in their effect to that produced by group therapy encounters.

Lozanov is very reluctant to admit the existence of a hypnotic element in suggestopedia. Yet a great deal of forceful suggestion is offered in suggestopedic classes *a la Lozanov*. E. A. M. Robinett, in her doctoral dissertation, *The Effects of Suggestopedia in Increasing Foreign Language Achievement* (1975), models her deprogramming exercise on Lozanov's pre-instuctional techniques. The following is an excerpt from Robinett's deprogramming model:

> To begin these exercises, assume a position with both feet flat on the floor. Deep, regular breathing will help you...Let your eyelids close...and repeat to yourself...Every day, I am getting

> better and better... My mind moves effectively...I am supremely calm...My memory is alert...(and so forth)...At the count of three, let your eyes open, but retain your relaxed state of mind, and listen with great interest and attention. (p. 63)

Very similar content is offered by A. Kovalev (1973), who terms his session hypnotic. Kovalev describes a meeting with a Soviet high school student in need of improvement. A short counseling session during which Misha (the student) ackowledges his shortcomings and asks for help, is followed, says Kovalev, by "a regular hypnotic session." Misha is told to close his eyes and relax. Then the mentor begins to suggest desired behavior modifications. Excerpts from the mentor's speech are given below:

> Listen carefully! Listen carefully! You are a good boy. You understand that you must do your homework! Always, always, always...You will go home, have your dinner, rest a while, and then immediately start on your lessons...Tomorrow you will answer well. Answer well! Answer well!...Repeat after me...today and always I will do my homework...today and always... today and always...Listen to me...for good behavior and study, we will readmit you to the Little Pioneer League...Your peers will like you...You will be happy, happy, happy...Open your eyes now. This is all for today. (p. 244)

The resemblance between the two sessions is indisputable.

It must be stressed at this point that a heterosuggestive approach which is wholistically beneficial to the student is, or can be, very valuable, just as is hypnotherapy. Yet, fear of heterosuggestion under hypnosis as a classroom pedagogy will be detrimental to the method. This fear, however supressed, is a negative reinforcement and will reduce the instructor's effectiveness as well as the student's ability to "let go," relax, and learn.

No judgment is made in this article on the ethics of classroom hypnosis, and no definite position is taken on whether hypnosis is indeed a component of suggestopedia. This writer can only state that one must not bar the possibility of light hypnosis being induced in a suggestopedic class. Keeping this in mind, the instructor then could select either to use or not use suggestopedia.

The Concept of Intuitive Learning

Another stumbling block in accepting suggestopedia in the West is the attitude toward the concept of intuitive learning. Whereas in Western philosophy, explains I. K. Taimni *The Science of Yoga* (1974), intuition is often equated with the absence of reasoning, in yogic philosophy (on which suggestopedia is partially based), intuition is viewed as a transcendent faculty of perception which dispenses with the use of customary cognitive sensory paths. Called Pratibha in Hindi, this faculty is direct and instantaneous. It bypasses all learning barriers so often referred to by Lozanov and his followers in describing suggestopedic lessons.

Mircea Eliade, in his work, *Yoga: Immortality and Freedom* (1958), reports on the superiority of intuitive over cognitive learning. According to yogic doctrines, maintains Eliade, intuitive perception is a subconscious psychomental activity directed toward either an object or information.

During deprogramming suggestopedic sessions, auditory channels remain open initially in order to activate a "lever" which "switches" cognitive perception to another modality, that of intuitive perception, also referred to as subliminal perception. Visual channels remain inactive during deprogramming sessions when students are asked to mentate (visualize with eyes closed). Once the intuitive, or subliminal, mode takes hold, all suggestions and/or information are received in wholistic images rather than in linear progression which is characteristic of cognitive learning, slow, deliberate and judgmental.

Wilson Bryan Key, in his best-seller *Subliminal Seduction* (1973), refers to subliminal stimuli and passive receptivity (Lozanov's pseudo-passiveness), as having an extrordinary effect upon human perception. Although Key discusses mainly the negative (commercial) aspects of subliminal perception, there is no reason why one could not take advantage of the positive aspects of subliminal learning.

At this juncture in our quest for accelerated learning, we should review our personal attitudes toward altered states of consciousness, heterosuggestion and the concept of intuition. No method can be successful if the instructor doubts the validity of its theoretical foundations, because if he harbors such doubts, he will subliminally broadcast his lack of conviction and consequently undermine the success of the accelerated teaching.

It must be understood that one cannot obliterate "offensive" theoretical bases of suggestopedia by ignoring them. Heterosuggestion, intuitive perception, and perhaps hypnosis are part of Lozanov's theoretical construct which was developed within the confines of a communist socio-cultural environment.

For those who cannot accept suggestopedia in its pure form, relaxopedia seems to be the most desirable alternative. The relaxopedic approach with alpha state induced through autosuggestion rather than heterosuggestion, can be accepted in the West where the latest findings in the field of brain research and the popularity of the biofeedback experiments have lent an aura of respectability to this type of research.

Relaxopedia does not offend. It does not call for sophisticated hardware or comfortable sleeping accommodations. Above all, it does not rely heavily on either the principle of authority, as perceived by East European methodologists, or on heterosuggestion which in the Western world is often equated with "brainwashing," and shied away from by Western educators who view it as a negative and possibly dangerous mode of instruction. Relaxopedia relies mostly on a type of auto suggestion described by Elmer and Alyce Green (1977), in their experiments conducted at the Menninger Clinic in Topeka, Kansas. It was noted that students were able to self-induce a state of "reverie" which, through routine practice, enabled them to improve their self-images and accelerate substantially their acquisition of new knowledge.

Procedural Variables

Lozanov's procedural variables, although modified from time to time, remain more constant than the variables used by American practitioners. Some of the American innovations are listed below.

Musical selections.

Selections from classical baroque music, largo movements are being replaced with selections from modern baroque, Halpern music, popular music and in some cases, no music at all.

Yoga breathing.

This is either omitted or modified to a degree where the yoga rhythm becomes no longer recognizable.

Class duration.

The traditional three-hour class is scaled down to accommodate individual schedules.

Classroom environment.

Lights are bright rather than dimmed as in the Lozanov experiments; classrooms are often noisy; chairs are uncomfortable; the environment in general is nonconducive to inducing alpha state, that state of consciousness which is essential to accelerate learning.

Materials.

Very few American educators use traditional Lozanov-design materials, creating instead their own or adapting the existing textbooks to their own versions of accelerated lessons.

Sequence of presentation.

This fluctuates from experiment to experiment.

Teacher training.

Whereas suggestopedic teachers from the Soviet Block are trained in drama and voice, their American counterparts are not. Thus their respective pedagogies are per force dissimilar.

How do these alterations affect the outcome of suggestopedic experiments in the West? It is the opinion of this writer that since hypermnesia is achieved when electrical activity of the brain is slowed to alpha state and since alpha state is induced mainly through such devices as appropriate musical selections and yoga rhyhmic breathing, these procedural variables must be considered the most important ones in any classroom where substantial hypermnesia is expected. Their omission will affect the success of a suggestopedic session.

When alpha state is achieved and successfully maintained, the remaining variables become less important. If, however, no alpha state is achieved, then the teacher's behavior, classroom environment, materials and so forth, will become crucial, just as they are in nonsuggestopedic classrooms.

Conclusion

Controversy is likely to be stirred wherever suggestopedia is used, or even discussed. This controversy reflects the value system of the society to which suggestopedic concepts and practices have been introduced. The method itself is neither intrinsically good or evil. Ethics of suggestopedia are determined by the motives of those who control the experiments. The new practitioner of suggestopedia should expect to encounter some resistance to his methodology, and be prepared to counter raised arguments. He also should realize that successful adaption of suggestopedia requires thorough knowledge of its theoretical basis, and that certain phases, namely those used to induce alpha state, may not be omitted if significant results are expected.

Suggestopedia may not be appropriate in every socio-cultural setting. In noncommunist systems, opposition to some of its philosophies or techniques may preclude its use. For every situation, however, there is a pedagogy of accelerated learning which will satisfy both the student and society. If the effectiveness of the chosen method is less striking than that of suggestopedia *a la Lozanov*, let us accept this as the price to be paid for selecting a system on the basis of our own preferred "attitudes."

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Les environnements socio-culturels et la suggestopedie.

Une étude fut faite sur les bases théoriques de la suggestopedie--le principe de l'autorité, "l'affaiblissement" psychologique de l'etudiant, le développement collectif contre l'accomplissement individuel, l'acquisition intuitive et l'élément hypnotique de l'hétöosuggestion--dans le context l'environnements socio-culturels opposés: le système communiste et le système capitaliste.

Sozio-kulturelle Umgebungen und Suggesop.die.

Ein Untersuchung über die theroetischen Grundiagen von Suggestopädie--das Prinzip von Autorität, gesitige "Schwächung" des Studenten, kollektives Wachstumgegen individuelle Lesitung, intuitives Lernen und das hypnotische Element von Heterosuggestion--wurde im Kontex von konstrastiven sozio-kulturellen Umgebungen (kommunisticschen und kapitalistischen Systemen) durchgeführt.

Medo ambiente socio cultural y sugestopedia.

Una investiación fue hecha con las bases teóricas del la sugestopedia--el principio de la autoridad, "debilitamiento" sicológico del estudiante, desarrollo (crecimiento) colectivo versus realización individual, aprendizaje intuitivo y el elemento hipnótico de la heterosugestión--sin el contexto de contraste de los medios ambientes socio-culturales: sistemas capitalista y comunista.

J. of the Society for Accelerative Learning and Teaching, 1983
8/1 & 2

Some Implications of Consciousness Research for Education

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Abstract

This article examines the historical perspectives influencing education in regard to learning, memory, and related functions of human consciousness. The author explores how research in hemispheric-related skills, brain growth stages, learning styles, imaginative and creative thinking and the potential of suggestion, has led to a time when education may feel the implications of consciousness research. The author then offers some education alternatives, existing at this time, promoting mental shifts from the analytical, logical, verbal mode to the global, intuitive mode of thinking. Lastly, the article investigates possible scenarios for future educational systems.

Historical Perspective

Since the days of the ancient Greeks and Romans, education has been influenced by knowledge and beliefs about learning, memory, and related functions of human consciousness. Aristotle believed that we remember information by forming images of it, and that we recall these images by ordering them in sequence, associating them with one another according to principles of similarity, contrast and contiguity (Wittrock, 1978). In ancient Greece and later in Rome, Aristotle's conception of memory and recall affected educational practices. Students, teachers, lawyers, statesmen and civil servants were all taught to generate images of the ideas they wished to remember, to associate the images with familiar objects in their homes and to order these images and objects in easily remembered sequences.

During medieval times, Thomas Aquinas revived the classical art of memory. He taught it to many clergymen and teachers, using Aristotle's ideas about memory to help people understand and remember his religious dictums. One of the innovations of the Renaissance was a revised educational curriculum heavily influenced by the writings of Plato.

In 1590, Rudolf Goeckel, for the first time, used the word "psychology" in the title of a book (Watson, 1963, p. 130). Half a century later, Rene Descartes, in his dualistic approach to consciousness, emphasized the cognitive aspects of the mind. In the following years, two points of view — the phenomenological and the mechanistic — emerged as ways of dealing with the so-called "mind/body problem."

The psychology of J. F. Herbart, appearing in the 1880s, was based upon interpretations of experience, metaphysics, and mathematics. He stated that psychology was fundamental to educational theory and practice. Herbart's most influential idea, reminiscent of Aristotle, was that one should introduce new material to students by building upon familiar ideas.

At about the same time Wilhelm Wundt stated that psychology, as a science, cannot be based on any metaphysical assumptions; to him, the experimental method was necessary but incorporated *introspection* as an investigative tool. Socrates had made an appeal for the importance of introspection in self-knowing, and Descartes had concurred. However, Wundt combined the introspective process with experimentation in studying the contents of consciousness (Watson, 1963, p. 243).

In 1887, George Trumbell Ladd stated that psychology could be defined as "the description and explanation of states of consciousness as such." This point of view was adopted by William James (1892) and several other early psychologists. However, John B. Watson, in a 1913 paper titled "Psychology as the Behaviorist Views It," urged that attempts to understand consciousness be abandoned in favor of objective observation and measurement. Through observation, the study of animals, infants, and emotionally-disturbed individuals, previously excluded from a largely introspective psychology, could be easily included. Thus, it might be argued that Watson both broadened and narrowed the scope of psychology (Hilgard, 1980).

By the 1920s, psychology had become defined as the scientific study of observable behavior. But three decades later, developments in cognitive psychology, humanistic psychology, and the neurosciences had begun to reintroduce consciousness as a legitimate scientific concern and psychology was redefined as the study of behavior and experience. For example, E. R. Hilgard's 1956 edition of *Theories of Learning* emphasized fundamental distinctions between stimulus-response theories and cognitive theories. "Subjective behaviorism" was introduced in the book *Plans and the Structure of Behavior* by George Miller, E. H. Galanter, and Karl Pribram (1960).

Meanwhile, consciousness research was advanced by the discovery that rapid eye movements were quantitatively related to reported dreams. This demonstrated that objective and subjective methods could be combined. Furthermore, research in hypnosis and in psychedelic drugs suggested ways in which unconscious material could be elicited in the laboratory. Biofeedback technology produced evidence that many internal states could be subject to voluntary control.

As a result of these developments, a "new introspectionism" has emerged in the study of spontaneous fantasy, daydreaming, meditation, and creativity. In addition, advances in neurophysiology have produced data concerning the two cerebral hemispheres as well as the role played by brain chemicals in regulating behavior. This has led to increased research interest in the integration of physical and mental phenomena, and how that integration can be described and conceptualized.

Developments in the new introspectionism have been stimulated by recent studies on the stream of consciousness (Hilgard, 1980). The question has been posed whether interpreting the flow of consciousness can be done only by literary figures such as James Joyce, Virginia Wolf, and John Dos Passos, or whether it can be assimilated into a scientific psychology. Many contemporary investigators have answered that it belongs to psychology today as much as it did when William James (1892) mentioned the importance of the stream of thought.

Klinger and Singer

Many of the methods used in the new introspectionism fit easily into familiar experimental patterns. Erik Klinger (1978) has described five procedures for obtaining systematic reports of inner experience: questionnaires, event recording, thinking out loud, descriptive thought sampling, and thought sampling using ratings. For example, a subject can carry out an assigned task during which he or she is interrupted and asked to tell what has been going on in his or her mind. The subject mentally reconstructs whatever was going on before the interruption. In the rating variation, the reply requires only acknowledgement of the presence or absence of specific thoughts.

Using these approaches, Klinger (1971) found that the flow of fantasy could be analyzed into components. He has argued that fantasies are *response sequences* and that images are responses. To Klinger, eidetic imagery demonstrates that "sensory fields may be stored in the nervous system in exquisite detail" (Klinger, 1971, p. 124). Further, he has produced data suggesting that images and hallucinations can be both conditioned and extinguished. Consequently, imagery probably plays a significant role in learning.

Instead of serving frivolous functions, Klinger (1971) considers fantasy highly adaptive. In the course of fantasy, a person reviews, recombines, and sometimes reorganizes information — often creatively. Fantasy can be viewed as a channel for performing preparatory work fortuitously between emergencies. Thus, fantasy, imagery and related processes perform the significant function of mental self-organization for the individual (Klinger, 1971, p. 356).

A cognitive approach to daydreaming research has been taken by Jerome Singer (1966), who has defined it as a shift of attention away from an ongoing physical or mental task, or from a perceptual response to external stimulation, towards a response to some internal stimulus (Singer, 1966, p. 3). Singer began to study these phenomena by recording his own daydreams, noting that they fell into two categories: 1) persistent childhood fantasies and 2) ongoing streams of associations and interior monologues associated with particular problems or thought chains. He then arranged for his thought processes to be interrupted by an alarm at five-minute intervals, and classified his experiences on such dimensions as degree of symbolic content, degree of visual imagery, and degree of non-visual imagery. He then studied the daydreams of others using questionnaires and interviews, finding few sex differences but major differences in age, educational backgound, and socio-economic status.

Singer's (1966) data contained several surprises. Rather than a rare phenomenon, it was discovered that 96 percent of his subjects reported that they engaged in daydreaming daily. Against the conception of daydreaming as primarily pathological, it was found that introverted children who daydream frequently are unlikely to end up as schizophrenics. Furthermore, hallucinating individuals showed less daydreaming than non-hallucinators, suggesting that daydreaming prepares adults to accept their own inner processes and differentiate fantasy from reality more precisely. Daydreaming, then, is neither trivial nor pathological but an important cognitive skill, available for the enhancement and enrichment of life (Pope & Singer, 1978).

Klinger, Singer, and many other contemporary cognition researchers have attempted to conceive a set of finite mental systems that people use to generate infinitely varied actions. This approach has been in evidence in many of the recent studies of selective attention, imagery, verbal encoding, memory, and retrieval (Wittrock, 1978, p. 62). Recent research in artificial intelligence and computer technology has this cognitive flavor, positing "executives," "buffers," and "memory stores," defined as internal structures and functions that mediate delayed performances.

Defining Consciousness Research

Consciousness research has been described as the investigation and manipulation of the psychophysiological processes associated with awareness, cognition, associative memory, abstract thought, symbolic communication, and language (Rheingold & Levine, 1982). Two central concepts of consciousness research differentiate it from brain research and cognitive science, two fields with which it overlaps to some extent: 1) the centrality of the role and meaning of subjective experience, the dynamics and flow of which are not only the central phenomenon of consciousness but also a resource which can be tapped, and 2) the concept of altered (or alternate) states of consciousness, with its implication that training to increase individual flexibility in achieving different conscious states is a cornerstone for expanding the actualization of human potentials (O'Regan & Harman, 1982). In any discussion of the implications of consciousness research for education, data from brain research and cognitive science must also be included. However, it is the variety of subjective experience that provides the unique domain of consciousness research.

Perhaps the development in all three of these areas which has received the most publicity in recent years is the research dealing with the brain's right and left cortical hemispheres. This work dates back to 1836 when Marc Dax, an obscure country physician, read a paper at a medical society meeting in Montpellier, France. Dax had been struck by what appeared to be an association between the loss of speech and the side of the brain where neurological damage had occurred. He summarized these observations and presented his conclusions: each half of the brain controls different functions, speech being controlled by the left half. The paper aroused little interest and was soon forgotten. Dax died the following year, unaware that he had anticipated one of the most active areas of scientific inquiry of the second half of the twentieth century (Springer & Deutsch, 1981).

As research into the specialized functions of the brain's two hemispheres proceeded, the results suggested a natural dichotomy based on different ways of dealing with information. The left hemisphere, for most people, appeared to be specialized for language functions, and these specializations were shown to be a consequence of the left hemisphere's superior analytic skills, of which language is one manifestation. The performance of the right hemisphere, superior in visual-spatial tasks, results from its synthetic and holistic manner of dealing with information.

However, this verbal/nonverbal dichotomy is too simplistic to explain all of the data from split-brain, brain-damaged, and non-damaged subjects. Thus, it would be more accurate to speak of an analytic/holistic distinction. This neurophysiological perspective on traditionally psychological domains has resulted in a reconsideration of the scientific investigation of consciousness. Robert Ornstein (1977), for example, has called upon psychology to return to its original focus — an examination of conscious experience, using the new tools which are now available.

Ornstein (1977) proposes that the cerebral hemispheres are specialized for different types of thought, and claims that our schools spend most of their time training students in what appears to be left-hemisphere skills. Joseph Bogen (1975) concurs that the hemispheric differences have important implications for education. In Bogen's view, Western society has over-estimated reading, writing, and calculation at the expense of other tasks. For example, he believes that intelligence tests are directed toward left-hemisphere abilities. The use of these tests becomes justified in a society that evaluates success in terms of productivity and financial earning power. However, Bogen states, these tests do not take into account artistic creativity and other, perhaps higher, forms of expression.

Some writers have suggested that there are distinct intersocietal ways of thinking. Bogen and his associates (Bogen, DeZare, Tenhouten and Marsh, 1972) compared the performance of 1,220 persons of varied backgrounds on tests which purport to tap hemispheric performance. The results seemed to demonstrate that Hopi Indians and black Americans relied on their right hemispheres in thinking more than did the others tested. However, the study could be criticized on the grounds that these differences simply restated cultural differences which exist on verbal intelligence tests (Springer & Deutsch, 1981). Yet, this study and those like it are often used by proponents of the notion that, due to the socialization process in Western culture, half of our mental capacity is neglected, specifically the right half. The major business of the left hemisphere, these writers claim, is the logical representation of reality and the ability to communicate with the external world. The province of the right hemisphere, in contrast, is said to be understanding patterns and complex relationships that may not be very logical, but which are essential for innovation and insight (Springer & Deutsch, 1981, p. 191).

However, in an authoritative review of the research literature, S. P. Springer and George Deutsch (1981) found no reason to believe that styles of thinking are divided along hemispheric lines. They note that in certain stages, the formation of new ideas may involve intuitive processes independent of analytic reasoning or verbal argument. Preliminary ordering of new data or reordering of pre-existing knowledge might arise from random activity. However, we have no conclusive evidence that these are exclusively right-hemisphere functions. According to Springer and Deutsch, our educational system may miss training or developing half of the brain, but it probably does so by neglecting the talents of both hemispheres (p. 192).

The cortical hemispheres overlap greatly in ability and function; they are intimately connected with each other through the cerebral commissures and other tissues. For example, the right hemisphere comprehends but cannot reproduce speech. The so-called dichotomy between the hemispheric functions probably results from a slight advantage one strategy has over another strategy, which is operationally sufficient to produce specialization of some functions. However, to apply such data to educational planning would probably be premature.

In regard to this issue, Marcel Kinsbourne (1982) discusses the copying of shapes. According to his model, the left hemisphere contributes to the overall performance and formulation of an action plan, transducible into acts of copying. The right hemisphere contributes the spatial framework into which the outcome of each act is successively entered, to preserve the proper relationship between action components. To think of each of these two ingredients as independent, representing alternative approaches to the act of figure copying, makes little sense. But this is precisely what some enthusiastic writers have done who speak of drawing from different sides of the brain. Kinsbourne points out that all parts of the healthy brain are at all times available for use. However, some people will use certain parts of the brain more frequently and intensely than will others. Most of the time, people range freely across and between the hemispheres, integrating the products of diverse mental operations into their overt behavior or covert mental activity.

Abundant evidence exists that cerebral lateralization is important for the development of human cognition. It is also clear that if asymmetric neural circuits of the brain are not brought into play at certain critical times of development, they may never be capable of full functioning (MacLean, 1978, p. 341).

Indeed, there is a division of labor between the hemispheres, and attempts to capture the essence of this dichotomy in a simplifying formulation are justifiable. But there is no reason to assume that this dichotomy in the brain represents the most polarity in human behavior. There are many polarities around which useful constructs about aspects of the mind can be formulated. Such constructs have their own justifications, and need not appeal to brain organization for validation.

Brain Growth Stages

Human brain growth occurs primarily during the age intervals of 3 to 10 months and from the ages of 2 to 4, 6 to 8, 10 to about 12, and 14 to about 16 years (Epstein, 1978). These well-established intervals correlate in time with the classical stages of intellectual development as described by Piaget, except that the 14 to 16 year growth stage has no Piagetian counterpart. Recent work, however, has yielded preliminary evidence for such a stage appearing at that age span (p. 344).

Intensive and novel intellectual inputs to children may be most effective during the stages of brain growth and subsequent integration. Novel challenges that are presented at the wrong time, however, might turn off the ability to absorb some of these challenges at a more appropriate age. The typical results of the Head Start programs were a rise in IQ from 10 to 15 points during the first year, followed by a steady decline so that by the end of second grade there was no difference between Head Start and non-Head Start children. This could have resulted from an unfortunate choice of exactly the wrong ages for the intervention because the 4 to 6 year age period is one of minimal brain and mind growth; both earlier and later programs would be more likely to succeed. A number of such projects, in fact, have produced apparently permanent increases in intellectual functioning of children from low-income homes providing that intervention started after age 6 or by age 2 (Epstein, 1978, pp. 359, 362; Rhine, 1981).

H. T. Epstein (1978) points out that intensive intellectual input should be situated at the spurt ages. He claims that the benchmarks of development are the simultaneous appearance of cognitive and moral stages whose fostering should be a minimal goal of both home and school activities (p. 362). Paul MacLean (1978) adds that if empathy is not learned at a critical age, it may never become fully developed. According to MacLean, "Adolescents not only need to be exposed to human suffering, but also need to be given the responsibility for ministering to it" (p. 341).

When the human brain is being programmed for the mental growth spurt and the correlated jump in brain growth between ages 2 and 4, it is simultaneously being programmed for vision, language, hearing, and speaking. Educational workers, according to Epstein (1978) also need to help very young children to overcome physical handicaps impinging on their learning capacities. They would possibly have a more positive prognosis if such efforts were implemented during periods of rapid growth (p. 370).

Postnatal insults to human brain development are usually the result of undernutrition and perhaps also environmental deprivation. The former causes decreases in both cell number and the complexity of neural networks. The latter has been studied with rodents but not, to any significant degree, with humans (Epstein, 1978, p. 353). Nutritional deficit in some studies has produced an average lowered IQ of 25 points; this effect persists even if the children later receive adequate diets. Epstein states, "The building of an adolescent brain on top of an architectually abnormal brain yields an even greater abnormality than that existing at the end of the original condition" (p. 357).

As far as major brain injury is concerned, the young child's brain is highly plastic. Portions of the brain damaged when the child is very young may lose some of their full functioning. However, over time, with proper stimulation, the functions may reappear (Chall & Mirsky, 1978, p. 372).

Epstein (1978) also points out that the brain growth spurt of girls at age 11 is about twice that of boys, while something like the converse is true of the brain growth acceleration that occurs around age 15. It could be stated that girls, in general, need a different curriculum from that of boys at those ages, with far more intense and complex input being appropriate for girls around the age of 11 and less intense and complex around the age of 15. The current system's failure to adapt educational inputs at the proper age for the far greater capacities of girls at this age might be partly responsible for the relative lack of females in the more theoretical or abstract professions (p. 367). In addition, of course, there are important sociological factors at work dealing with sexual stereotypes, self-concept, and the expectations of families and teachers.

Learning Styles

It is too early to make definitive statements concerning the presence or absence of relationships between brain structure and learning styles. However, there are research data bearing on the existence of various styles of learning. As the diversity of the public school population continues to grow, educators are being called upon to incorporate various instructional strategies that are designed to accommodate different learning styles (Zigler & Muenchow, 1979).

Learning, or cognitive, styles can be thought of as relatively stable ways by which individuals perceive, conceptualize, and organize information. One model holds that the child's initial global percepts and concepts become more highly articulated and differentiated with development (Wittrock, 1978, p. 90). This model posits two conceptual orientations: egocentric and stimulus-centered; and three conceptual classes: analytic-descriptive, inferential-categorical, and relational (the latter two being non-analytic in nature).

A child with an analytic-descriptive style would group stimuli by their similar elements, e.g., a table and a chair fall together because they both have four legs. The non-analytical styles group would link stimuli that are functionally related to one another (e.g., a table and chair are both used for dining) or on commonalities of the whole (e.g., people can be classed together who are all farmers). Children with analytic orientations are found to ignore distracting stimuli, whereas non-analytic children tended to be impulsive (Kagan, Moss, & Sigel, 1963).

Tamar Zelniker and W. E. Jeffrey (1976) related learning styles to a model of cognitive processes of the brain. They hypothesized that reflective children (e.g., children who are above average on both accuracy and latency of response) differ from impulsive children (e.g., those who are below the mean on both accuracy and latency of response) in their information-processing strategies. They found that the reflective children used an analytic cognitive style while impulsive children used a global, non-analytic cognitive style. Impulsive children are more frequently found in the lower socio-economic classes but are not necessarily inferior to reflective children in problem-solving ability, especially when a global strategy is appropriate. From this, we can expect learning to be difficult when a mismatch exists between a child's global learning strategy and the analytic organization of instruction favored by most teachers.

Some writers hold that two incompatible learning styles — analytic and relational — develop in cultures emphasizing either shared functions or formal primary social groupings. Children with a relational (or non-analytic) style typically experience difficulty in schools and on tests where an analytic strategy is needed to succeed. Relational children in an analytically-organized school environment face a cultural conflict which must be seen as different than cultural deprivation (Wittrock, 1978, p. 92).

In an extensive series of studies, H. A. Witkin and his associates (1962) defined a field-independent or differentiated cognitive style and a field-dependent or global style. A field-independent person can better locate an embedded figure in a complex background. Compared with field-independent people, field-dependent people are more socially oriented, more aware of social cues, better able to discern the feelings of others from their facial expressions, are more responsive to a myriad of incoming information, are more dependent on others for reinforcement and for defining their own beliefs and sentiments, and more in need of extrinsic motivation and externally-defined objectives. Field-independent persons are relatively impersonal, individualistic, insensitive to others and their reinforcements, interested in abstract subject matter, and intrinsically motivated. They have internalized frames of reference, and experience themselves as separate or differentiated from others and the environment. They tend to use previously-learned principles and rules to guide their behavior.

There are data suggesting that boys who are most popular with their peers tend to be field-independent while the most popular girls are field-dependent (Witkin, et al., 1968, p. 221). Field-dependent adults tend to have more identity problems and unresolved dependency needs, often leading to alcoholism, obesity, ulcers, and asthma (p. 213). Field-independent adults tend to have more difficulties involving overcontrol, delusions of grandeur, and social isolation. Field independent students typically do better on examinations because they are less dependent on the examiner for a definition of the task and their role in it (p. 156). The analytical nature of the field-independent students also permits them to do better in the typical school situation.

M. C. Wittrock (1978) suggests that instruction can be improved when it is based upon process-oriented learning styles that relate to knowledge about the encoding strategies of the learner. Instruction should begin with careful observation of learners, their constructive processes, and their individual differences. Instead of age, sex, and intelligence, Wittrock proposes that the understanding of cognitive styles and learning strategies of students promises to lead more directly to proper instructional procedures. One clear implication that emerges is the importance of the mental processes and intellectual backgrounds of learners that occur during instruction and teaching. The same treatment may mean something different to different learners; different treatments may be needed to attain the same ends with different individuals (p. 96).

For Wittrock, the teacher rather than the subject matter is given new importance. Original challenging functions need to be performed with students. Learning is not confined to one objective at a time, nor is it a one-dimensional, step-by-step procedure. Recent research data imply that the brain constructs meaning in at least two different ways — by imposing either analytic or holistic organizations on information.

The extensions of this important finding lead into curriculum design, the sequencing of instruction, and the learner's elaboration of information by means of different organizational strategies. This finding also implies that instruction organized to induce gestalt-synthetic processes will be different from a linear sequence of information illustrated with pictures. An inductive, or other non-linear, order of information seems more appropriate for inducing a synthetic or global processing strategy. Reinforcement (defined either as informational feedback or as an automatic process of learning) that is appropriately designed for one learning style may be poorly timed, random, or disruptive for the cognitive strategy of another learner. The organized multivariate reality constructed by the learner is far more sophisticated than the reality that simplistic instructional procedures are designed to accommodate (Wittrock, 1978, p. 100).

It may be asked whether an integration of cognitive approaches produces superior learning. Preliminary data are available from a study of 57 academically-gifted high school seniors conducted by Conchita Tan-Willman (1982). In comparison to 52 students who were not academically gifted (as identified by school records), a gifted group demonstrated more integration on the Torrance Style of Learning and Thinking questionnaire. However, the female subjects, both gifted and non-gifted, showed more of an inclination toward integrated learning and thinking styles than the male subjects. The gifted males were more specialized in their styles (either linear or global) than both the female groups, supporting the notion that there is a need to utilize more educational methods emphasizing global, non-linear synthesizing, and simultaneous intuitive processing of information for female students. Moreover, the wide range of thinking and learning styles revealed in the study indicated the necessity to view learners as individuals.

This capability to view learners individually is typical of the creative teachers identified by Paul Torrance (Torrance & Myers, 1970). In a class on "Creative Ways of Teaching," 165 of 200 teachers were able to recall instances in which they encouraged students in ways that resulted in transformational experiences. For example, 1) children changed from "hopeless, unteachable non-readers" to average or superior readers; 2) children turned from well-established patterns of vandalism, destructiveness, and lack of school achievement to productive, altruistic behavior; 3) emotionally disturbed and unproductive behavior changed to constructive behavior and above- average achievement; 4) alienation and rejection transformed into acceptance and healthy contact with reality; 5) apathy and hatred of school changed to enthusiasm about learning and outstanding achievement; 6) bitter, hostile sarcasm changed to kind, thoughtful behavior; and 7) children officially diagnosed as mentally retarded moved to above average intellectual functioning and school achievement.

Research on Imaginative and Creative Thinking

Paul Witty (1965) describes gifted individuals as those whose performance in any valuable line of human activity is consistently or repeatedly remarkable. Torrance (1970) defines creativity as the process of sensing gaps or disturbing, missing elements; forming ideas or hypotheses about them; testing these hypotheses; and communicating the results, possibly modifying and retesting the hypotheses. Creative thinking has been described as the imaginatively gifted recombination of known elements into something new (Shaughnessy & Tevelowitz, 1981).

Torrance has designed the most frequently used measure of creativity, the Torrance Tests of Creative Thinking (Torrance, 1974). He has used these tests in his well-known classroom studies of creative behavior. To examine the validity of the measures, Torrance (1974) followed up a group of 103 male and 59 female students who had been examined in 1959 when they were enrolled in grades 9 through 12 of a midwestern U.S. high school. Portions of the tests were scored for 13 criterion-referenced indicators of creative ability. In 1971, they were evaluated on the basis of three criteria of adult creativity: number of publicly-recognized creative achievements, quality of highest creative achievements, and creativeness of future career image. All males and all former 12th graders showed significant correlations between the 13 test indicators and the three criteria of creative achievement. For the rest of the sample, 12 of the 13 correlations were significant. Hence, the data strongly supported the validity of the Torrance Tests of Creative Thinking.

Jerome Singer and Dorothy Singer (1977) have presented evidence that a high level of imaginative play in children is closely related to an extended vocabulary, the ability to categorize materials, and the ready retrieval of words or images. Play in early childhood appears to be a crucial, adaptive resource by which children can organize complex experiences into manageable forms, providing anticipatory images for future guidance. In one study involving 140 three- and four-year-old children, the imaginativeness of play was associated with ratings of positive affect and elation. Children who develop their ability to pretend appeared to be happier and more deeply involved with learning.

Beverly Galyean (1982) trained three tenth-grade teachers of remedial composition to use a specific imagery activity during one 50-minute class period. Post-imagery compositions improved to a greater extent than in control sessions devoid of imagery activity. One student made the comment, "After we did the imagery, everything became easy.

It was as if someone were writing for me. I want to do this again" (p. 7). Other studies also demonstrate the utility of imagery in successful programs for remedial readers and writers (Chall & Mirsky, 1978, p. 374; Samuels & Samuels, 1975; Radaker, 1963). Further, Wittrock (1978, p. 97) cites a series of studies which led to an improvement of individuals' response to instruction due to procedures designed to induce the generation of images to accompany the text being read.

There are several parallels between the research studies on the encoding processes of the brain and the psychological research on verbal processes and imagery in encoding. Dual process models of encoding that emphasize imagery on the one hand, and verbal and analytical processes on the other, are frequently studied. The brain stores neither words nor pictures but representations of both. Pictures generated by elementary school children somewhat enhanced the learning of definitions of words in one study, while teaching strategies that elaborate verbal information in a synthetic spatial or imagery strategy have been found to facilitate memory (Wittrock, 1978, p. 75).

The Potential of Suggestion

Since no individual is able to acquire from his or her own personal experience all of the knowledge needed to survive and function in modern society, we must each develop a selective readiness to accept and to incorporate into our reality system various bits of knowledge which have not been verified or logically tested. Young children quickly learn to trust the judgment of their parents and to rely upon them to help define the nature of the real world. This procedure is followed throughout life, usually unconsciously, as suggestions are accepted and incorporated into an individual's system of perceived reality. Hypnosis represents the most obvious example of suggestion (Hilgard, 1980), but there are more subtle suggestive phenomena which operate in learning. Interpersonal expectancy effects in education have been identified; teachers will often obtain the results they expect from students due to bias, labels, or other suggestive effects that can produce self-fulfilling prophecies (Rosenthal & Rubin, 1978).

Perhaps the most carefully articulated approach combining verbal processes, imagery, and suggestion has been developed by Georgi Lozanov (1978) who has concluded that there are a number of "laws of suggestion" which operate in education and other forms of human communication. These "laws" form the basis of "suggestology," the practical application of which Lozanov terms "Suggestopedia." Suggestopedic methods claim to involve the simultaneous activation of concentration and relaxation, of logic and emotion, of both brain hemispheres, and of both conscious and unconscious processes. Often, students are presented with new information — such as vocabulary words — while reading them silently as the teacher dramatically intones the material. Then the teacher may present the material again with a different intonation accompanied by background music.

Suggestopedia also involves skits, psychodrama, and other opportunities to use the new learnings, such as a foreign language, in a lifelike situation. Lozanov has divided the material in foreign language learning into segments that comprise the basic grammar of each language as well as at least 2,000 words. He claims that students generally learn 90 percent of the vocabulary well enough to read it and 60 percent well enough to speak it (Krippner, 1970, p. 134).

When Lozanov measured the brain waves, muscle tone, and skin electricity of the students, he noted that they were in a condition of 'alert calmness" which did not resemble hypnosis, dreaming, or sleeping. Both hemispheres of the brain were active and many students showed higher than average percentages of alpha waves. The major attempts to investigate the efficacy of suggestopedia in controlled research settings have been carried out by Donald Schuster (e.g., 1976) and his colleagues. In general, the use of suggestopedic techniques in teaching foreign language has been found to be superior to traditional techniques, but the use of imagery is a crucial element. In one experiment, students were told *not* to use imagery and their scores dropped fifty percent (Krippner, 1980, p. 137).

One application of suggestology is the "Optimalearning" process developed by Ivan Barzakov (1982). Its expressed purpose is to accelerate learning while a larger purpose is to evoke creative potential. These aims are attempted through engaging participants with art, classical music, literature, visual design, theater, dance, games, group processes, suggestion, and both traditional and novel instructional materials. All of these are "orchestrated" in an attempt to activate the brain's full functional capacities.

Another application of suggestology has been made for children with learning disabilities. P. P. Brownlee (1981) suspects that many of these children are the victims of labelling; their hyperactivity, short attention span, and anxiety may reflect their defense mechanisms — or even their particular learning style — rather than neurological dysfunction. Suggestopedia has been found to be effective with some learning disability children, especially in regard to stress management, relaxation, use of imagery, use of positive affirmations, and use of suggestion. Even though no major alterations of consciousness occur during suggestopedic teaching, it is quite likely that suggestology represents the best example to date of the application of data from consciousness research to education.

Suggestopedic techniques typically involve the shifting of students' attention in learning tasks. Attention may be defined as the focusing of awareness on some environmental stimulus. The study of attention includes all the events from the impinging of stimuli on the receptor organs of the body through the central processing of the information in the brain, to the final expression of the process, usually in some motor or muscular act (Mirsky, 1978, p. 33).

Also critical to effective learning are a person's past experiences, training, motivation, or level of interest in a particular task at a particular time. These can modify his or her apparent attentive capacity at a given moment. The interaction of motivation and attention can be complicated. Motivation that is too high can be as deleterious for performance requiring attention as motivation that is too low.

Failure of attention does not occur so much as gradual diminution of a function — the way a generator slows down when its fuel supply is cut off. Failure is characterized by a series of sporadic or episodic grief failures interspersed with periods of normal or near-normal functioning of the system. The impairment of attention thus resembles that of an automobile engine with a dirty carburetor. The engine will sputter and misfire while running in a more or less normal fashion between misfirings. As the degree of impairment increases, the number of discrete failures increases, possibly to the point of complete absence of functioning. The term "lapses" has been used to describe the discrete and episodic failures in attentive performance and it resembles similar terms coined by other researchers. Thus, there is scarcely any human performance that is not dependent on some attentive capacity on the part of the learner (Mirsky, 1978, pp. 48-50).

In education, attention is a highly important area to explore in order to determine ways to influence encoding of information. In addition, attention is influenced by the past experiences and plans of the learners. The stimulation of attention can involve modifying a learner's goals and intentions, as well as involving novel instructional stimuli, subject matter, and texts.

Recent research on attentional mechanisms suggests that regular, repeated reinforcements for responses seem more likely to produce habituation and a lack of interest, perseverance, attention, and motivation. The attentional mechanisms of the brain often respond to novelty or the unexpected, in keeping with cognitive dissonance theory, or with some expectancy theories, or stimulus pattern theories.

In reviewing the data on attention, Wittrock (1978) identifies three relationships between education and the brain's cognitive processing: 1) Recent brain research findings suggest that process-oriented approaches are useful in the study of the ways human learners construct meaning from instruction; 2) Recent brain research is consistent with some cognitive models of learning and memory; however, cognitive functions cannot be reduced to neural structures, and psychological processes and educational methods should not be grafted onto the neurosciences; 3) Research on the human brain is consistent with some ancient ideas about the art of teaching such as those offered by Socrates, Plato, and Aristotle. These ideas emphasize the importance of the mental elaborations of the learner (p. 63). Indeed, in an educational process based on consciousness research, the learner must be given an important role. To learn, one should attend to the information and concepts in order to construct, elaborate, and extend cognitive representations of them. The teacher can facilitate these processes but the learner is the only one who can perform them (p. 101).

One of the most interesting findings about the brain is that it actively constructs models of the world. Learning and memory are influenced by the sets, intentions, and plans generated in the brain as well as by the information received from the immediate environment and from internal states, drives, and muscular responses (Wittrock, 1978, p. 64).

From research on the orienting response and other attentional mechanisms of the brain, discrepant, novel, original, and challenging stimulation — whose pattern is not always apparent — seems likely to excite at least transitory attention, and perhaps stimulates differentially one of several encoding strategies. Motivation reflects more than momentary environmental stimulation. In this framework, repetitions of reinforcers and behaviors seem more likely to produce habituation and boredom than increased attention and sustained interest.

Carl Bereiter (1982) has claimed that most learning is structural in nature and involves reorganization and reconstruction. This idea of a high level of structural learning that is hierarchically related to lower levels of learning that are also structural is one that can serve as the foundation for a powerful cognitive-developmental psychology of instruction. More effective cognitive development can be achieved if proper timing is observed.

Educational Innovation

The authorizing statute of the National Institute of Education mandates the policy of providing to every person an equal opportunity to receive an education of high quality. The statute further maintains that the American educational system has not yet attained that objective (Curran, 1982). As director of the National Institute, E. A. Curran (1982) stated that the most successful schools are characterized by identifiable factors, e.g., an orderly school climate conducive to learning principles, emphasis on basic skills, teacher expectations of high student achievement. But in addition to the basic academic skills, Curran called for better achievement in the higher-order cognitive skills of analyzing, understanding, distinguishing, and evaluating.

To those who view the development of cognitive skills as an intellectual pursuit that will favor the analytically-oriented student over the globally-perceiving student, Jean Houston (1981) has described an alternative. She and her colleagues at the Foundation for Mind Research have assisted many schools in the development of an "arts-related curriculum" in which children learn to think from a larger sensory and neurological base. Pupils are taught to work with clay, block printing, weaving, papier mache, tissue collage, chalks, and paints. In working with these items, children also have to learn in a tangible and expressive way many of the mathematical principles needed to carry out the work as well as principles of design, line, form, color, texture, and structure. Measurement and fractions are learned naturally and with ease as the child constructs art work. In order to weave, the pupils have to learn about making grids — but not in an abstract context. These children are taught to think in images as well as words, to learn spelling and arithmetic in rhythmic patterns, to think with the whole body — in other words, to learn basic skills by means of an enlarged spectrum of sensory and cognitive possibilities.

There are a number of guides for the teacher who wishes to use imaginative approaches in his or her classroom. *Drawing on the Right Side of the Brain* (Edwards, 1979) presents a set of basic exercises which purport to release creative potential; mental shifts are encouraged from verbal, logical thinking to a global, intuitive mode. *Put Your Mother on the Ceiling* (deMille, 1981) contains a series of games designed to promote flexibility and creativity in solving problems. It is based on the assumption that conscious and unconscious processes, including imagery, can bring about important changes in behavior. *Experiences in Visual Thinking* (McKim, 1972) and *The Metaphoric Mind* (Samples, 1976) also contain exercises which can be used by students of all ages. Educational consultants from Synectics, a firm specializing in teaching metaphorical thinking, were invited to organize a program in Lawrence, Massachusetts. After one year of training, first graders showed a 363 percent increase in knowledge of letters and sounds, a 286 percent increase in auditory comprehension, and a 1,036 percent increase in word reading. Among the questions in the exercises were, "What needs more protection, a turtle or a rock?" "Which weighs more, a boulder or a heavy heart?" "Which grows more, a tree or self-confidence?" The program is based on the belief that learning involves making connections that relate the new to the familiar. It is also believed that the exercises develop connections among various parts of the brain; indeed, education is seen as essential for optimal brain growth (Ferguson, 1980, pp. 303-305).

Self-Regulation

One of the most important developments in consciousness research is that of biofeedback and associated forms of voluntary control of internal states. In biofeedback, an instrument attached to the body gives a continuous record of one or more of a person's physiological processes so that he or she might learn to alter those processes directly. Thus, biofeedback can be used to help people control their pulse, blood pressure, brain waves, muscular tension, stomach acidity, etc. Similar effects have been obtained without instrumentation by autogenic training, hypnosis, progressive relaxation, and other types of self-regulation. A few pilot studies with students have yielded encouraging indications that biofeedback and training in self-regulation can improve academic performance and reduce anxiety (Ferguson, 1980).

If self-regulation could eventually extend to control of the brain's neurotransmitters, students could exert powerful effects on their own learning processes. George Leonard (1968) foresees an educational milieu combining self-regulation and computers which would include: 1) a full bank of the basic cultural knowledge, arranged for each pupil by computers in dialogue form; 2) the same basic material arranged in cross matrix form which would enable pupils to utilize cultural knowledge in creative ways. The material would be programmed to provide novelty and surprise, thus stimulating unique associations and discoveries; 3) a record of the child's physiological responses which would be fed into the instructional devices to provide an individually-adapted program based on each pupil's learning curve, short-term memory strength, changes in consciousness while learning, special skills and disabilities, as well as perceptual and cognitive styles.

Many other scenarios for future educational systems also emphasize procedures consistent with self-regulation. Claude Mathis (1982) points out that "the Learning Society is here and we should expand our thinking to accommodate it" (p. 10). He observes that education must be liberated from schools and schooling with their accompanying concentration on school age populations. The model of schools as the only empowered mechanism for education is now inadequate. Rather, many varied and different elements are needed as education becomes a self-directed development with a curriculum that weaves its way through all of society's institutions.

This self-directed development will enable people to manage their lives in a manner which will provide both personal and economic satisfactions within the framework of a value system that recognizes the rights of others to do the same. Such a human learning network would include formal schooling as a central core, but extend into the family, the community, the church, the workplace, self-help groups, clubs and social organizations, etc. In addition to the formal school curiculum, it would encompass socialization, education for leisure, education for acculturization, continuing education for professional advancement and career change, training for skill development and education for personal enlightenment.

Rudolf Arnheim (1979) would organize a "dream university" around philosophy, the art studio, and the poetry workshop. Philosophy would be asked to return to teaching of ontology, epistemology, ethics and logic. Art education would provide students with the skills to carry out such thinking while poetry would give students the capacity for thinking in images.

J. S. Chall and A. F. Mirsky (1978) describe the test battery of the 21st century as the responsibility of a team of specialists including the neuroscientist. It would encompass behavioral and photographic analysis designed to identify motor patterns, cerebral maturity, and related physiomotor and psychological capacities. It might also include electrographic and sensory tests which would provide data about the relative maturity and efficiency of information processing in all relevant sensory modalities. Attentional capacities would be assessed by both behavioral and electrophysiological means, and the sources of attentional difficulties (if any) would be categorized and identified with respect to intra- as opposed to extra-cerebral causes. Brain size, brain development, and relative degree of myelenization in key areas would be assessed by means of non-injurious neuro-radiological techniques (the progeny of today's computerized axial tomography scanners). Oxygen utilization in various brain regions at rest and during a variety of mental activities would be assessed by means of dynamic energy utilization techniques. Such methods currently exist and need only to be refined.

Brain neurohormonal balance and maturity would be assessed by means of biochemical assays performed on a few drops of urine and blood. Computer-assisted analysis of these data would enable the educational neuroscientist to perform an accurage assessment of students' developmental stage, their strengths and weaknesses, the instructional materials they would best be able to handle, and the problem areas that would most likely be encountered during their educational careers. This information would be made available to the child and teacher (or teachers) and would be continually updated and upgraded at regular intervals (pp. 377-378).

This concept resembles the visionary description of education offered by Aldous Huxley (1963) in his novel *Island*. An under-secretary of education in a utopian island republic describes how each child is evaluated:

> We begin...by assessing the differences. Precisely who or what, anatomically, biochemically and psychologically is this child? In the organic hierarchy, which takes precedence — his gut, his muscles, or his nervous system?...How harmonious or how disharmonious is the mixture of his component elements, physical and mental? How great is his inborn wish to dominate or to be sociable or to retreat into his inner world? And how does he do his thinking and perceiving and remembering? Is he a visualizer or a non-visualizer? Does his mind work with images or with words, or with both at once, or with neither-?...Does this child absorb all the vitamins in his food, or is he subject to some chronic deficiency that, if it isn't realized and treated, will lower his vitality, darken his mood, make him see ugliness, feel boredom and think foolishness or malice. And what about his breathing? What about his posture and the way he uses his organism when he's working, playing, studying?

> And there are all the questions that have to do with special gifts. Does he show signs of having a talent for music, for mathematics, for handling words, for observing accurately and for thinking logically and imaginatively about what he has observed? And finally, how suggestible is he going to be when he grows up?...Out of any hundred children, which are the twenty who will grow up to be suggestible to the pitch of somnambulism? (pp. 208-209)

A New Paradigm

Brendan O'Regan (1982) observes that over the past few decades, several techniques have been devised, applied and tested that at the very least promise to give people significantly increased access to their own potentials and capacities. Many of these approaches have been spinoffs from consciousness research, while others have emerged from brain research and cognitive science. It can be rightfully asked why we are not applying these techniques more extensively. Further, how does it happen that mainstream educational institutions have largely ignored even the most conservative pieces of information regarding these processes?

Perhaps an important answer rests in the assumption of the old paradigm, or world-view, of education and their clash with the new, emerging paradigm. Marilyn Ferguson (1980, pp. 289-291) has contrasted these assumptions, stating that the old educational paradigm emphasizes content and the acquisition of a body of correct information, whereas the new paradigm emphasizes how to learn, because what is "correct" today may change tomorrow. The old paradigm sees learning as a product, not a process. The old paradigm rewards conformity, not candor, dissent, or autonomy. The old paradigm has a rigid rather than a flexible structure, emphasizes lockstep progress, with a priority on performance rather than emphasizing one's self-image as the generator of performance. The new paradigm emphasizes inner experience over the external world, hence the use of dreams, images, and storytelling. The new paradigm allows guessing and divergent thinking as well as holistic, nonlinear and intuitive strategies in addition to the analytical linear strategies emphasized by the old paradigm. The new paradigm tries to avoid labelling children, is not concerned with "norms," and complements theoretical knowledge with experiment and experience, both in and out of the classroom. The new paradigm encourages community input, sees education as a lifelong process, and uses technology in a humanizing way. The new paradigm views the teacher as a learner in addition to being an instructor.

There is no automatic reason to abandon or change a worldview, especially if it appears to work fairly well. However, today's complex reality demands humans who can cope with a myriad of problems which the world has never confronted in such number and with such serious consequences attendant upon the decisions to be made. Education can take no chances in short-changing the brains and improverishing the spirits of those it services (Houston, 1981). Perhaps the insights of consciousness research can play a critical role in developing the individuals and societies needed for our uncertain future on this planet.

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Quelques implications de la recherche du conscient pour l'éducation.

Cet article examineles perspectives historiques qui ont influencé l'éducation en matière d'études, de mémoire et des fonctions reliées à la conscience humaine. L'auteur explore la maniére de laquelle la recherche des capacités dans les héisphères associés, les difféentes étapes du déeloppement du cerveau, les styles d'acquisition, la pensée imaginative et le potentiel de la suggestion ont pu amener l'éducation à ressentir les implications de la recherche du conscient. L'auteur offre alors à l'éducation quelques possibilités déjà existantes, en favorisant les changements mentaux aux détriments des changements analytiques, en favorisant la pensée globale et intuitive au détriment de la pensée logique et verbale. En dernier lieu l'article examine les scénarios possibles pour les systèmes éducatifs de l'avenir.

Einige Implikationen der Bewusstseinsforschung für die Erziehungswissenschaft.

Dieser Artikel überprüft die historischen Perspectiven, die in Bezug auf Lernen, Erinnerungsfähigkeit und verwandte Tätigkeiten des menschlichen Beweusstseins Einfluß auf Erziehungswissenschaft haben. Der Autor untersucht, wie die Forschung über hemisphärisch verwandte Fähigkeiten, Gehirnswachstumsstufen, Lernstile, phantasievolles und kreatives Denken und die Wirkungsfähigkeit von Suggestion uns zu einer Zeit gebracht haben, woran die Erziehungswissenschaft die implicationen der Beweusstseinsforschung bemerken könnte. Der Autor bietet dann der Erziehungswissenschaft einig Alternative, die heutzutage zuhanded sind. Das fördert dann geistiges Umschalten von der analytischen, logischen, verbalen Form zur globalen, intuitiven Form des Denkens. Zuletzt werden in diesem Artikel mögliche Szenaria für zukünftige Erziehungswissenschaftssysteme untersucht.

Algunas implicaciones de investigaciones rectas (concientes) para la educacón.

Este artículo examina las perspectivas históricas que influye la educación con respecto al aprendizaje, memoria y functiones relacionadas con la rectitud humana. El auto examina cómo la investigación en las habilidades hemisféricas relacionadas, grado de desarollo del cerebro, modos de aprendizaje, pensamiento imaginativo y creativo y el potencial de la sugestión, ha guiado a una época donde la educación puede sentir las implicaciones de la investigación recta. Luego, el autor ofrece algunas alternativas educacionales, existentes en este tiempo, promoviendo recursos mentales del modo analítico, lógico, verbal al global, modo intuitivo del pensar. Por último, el artículo investiga posibles escenarios para futuros sistemas educationales.

THE JOURNAL OF THE SOCIETY FOR ACCELERATIVE LEARNING AND TEACHING

Volume 8, Numbers 3 & 4 Fall / Winter 1983

Published by the Society for Accelerative Learning and Teaching, Inc.

ISSN 0273-2459

THE JOURNAL OF THE SOCIETY FOR ACCELERATIVE LEARNING AND TEACHING

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The Editor welcomes submission of manuscripts on an interdisciplinary nature relevant to all aspects of suggestive learning-teaching-therapy counseling within the theoretical and procedural confines of Suggestology and/or Suggestopedia. The JOURNAL FOR THE SOCIETY OF ACCELERATIVE LEARNING AND TEACHING will publish a wide variety of articles - including critical reviews, theoretical analyses, speculative papers, case studies, quasi-experimental studies, as well as reports of empirical research (basic or applied) of major significance. The basic focus is Suggestopedia theory , research and application.

MANUSCRIPTS should be typed on one side of standard (8 ½ x 11 non-corrasable) bond typewriter paper, clearly mimeographed or multilithed. *Do not use ditto.* The original and three copies (carbon or dry electrostatic copies) should be submitted. Authors should also keep a personal copy to check against proofs. *All material must be double-spaced*, with ample margins (1 ½ in. on each side and 1 ½ on top and bottom). Any paper should not be longer than 20 typewritten pages, excluding bibliography, footnotes, tables, figures, etc. In special cases, longer papers may be submitted for publication.

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The Journal of the Society for Accelertive Learning and Teaching
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JOURNAL OF THE SOCIETY FOR ACCELERATIVE LEARNING AND TEACHING

Volume 8, Numbers 3&4 Fall/Winter, 1983

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Subscription rates: $20.00 per year, individual subscription. Outside U.S. add $15.00 per year for air mail. (Canada and Mexico, same as U.S.)

Back issues: $7.00 per copy, $12.00 per doubled copy. List of available back issues sent on request.

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Mailing Permit 190, Ames, Iowa 50010.

Printed in the U.S.A.

J. of the Society for Suggestive Accelerative Learning and and Teaching, 1983, 8(3&4)

How to Develop a Non-Language Course Using Accelerated Learning

Ron Ennis

Abstract. This is a step-by-step outline for experienced SALT teachers to use in preparing plans and course materials. Covered are course goals, detailed plans, sequencing, tryout, preliminaries, decoding, concert session, elaboration, self-tests and globalization.

This outline is for experienced teachers to use in preparing course content that will use accelerative learning techniques. It is assumed that the teachers are highly knowledgeable in the theory and methodology of accelerated learning (suggestology) as well as their subject.

Steps

1. Thoroughly know your subjects.
2. Determine course goal. What knowledge, completeness and feelings, do you want every student to have at the end of the course? What is the whole picture? If the knowledge is developed sequentially, what is the end of the sequence you wish to cover in the course? Be prepared to have that end point extended because of learning acceleration, but for planning, set a clear, well-defined goal.

Examples

English history: "My global goal for this course is to have every student understand the significance of the Norman conquest for the future history of England. My specific goals are to have every student aware of the major contributions in politics, social relations, philosophy, religion, the arts, education and economics on the continent, as relevant to English history, and on the British Islands, from the period of the rise of Alfred the Great to the period of the War of the Roses and the decline of feudalism."

Statistics: "My global goal for this course is to have every student comfortable, thinking statistically, and mentally prepared to learn as much about statistics as she or he has a need. My specific goals are to have every student competent in all statistical methods required to understand and utilize analysis of covariance."

Develop a clear means of measuring the specific goals so that both student and teacher experience the successful learning. Develop as clear a measure as possible of the global goal as well. This measure may be very subjective and perhaps only apparent over time, but set the stage for awareness of global learning.

3. Working back from the specific course goal, lay out the sections required to reach that goal. Do this at least three ways:

a) List all of the elements which must be included to reach the goal and organize them into units. Remember that a global presentation of the whole course and of each unit is essential, so do not get too sequential at this point.

b) Determine the last element (unit of knowledge) necessary to have all the pieces together to reach the course goal. Tentatively set that unit as the last to be covered in the course. Figure out the last element necessary to reach the "last element" determined above. Continue to figure out the elements required sequentially, working backward from the course goal to the beginning of the course.

c) Now that you have, in effect, a course outline, review it to see if it, as a whole, gets you to your specific course goals, and if it gets you to your global course goal. Test the outline on knowledgeable others. Get all the feedback you have time for. Reorganize the outline as required. Continually ask yourself, "Why am I including this?" and, "What else do I need?" Then ask, "Why?" again.

4. Organize the units so that they fit into the three-stage Accelerated Learning format and into your time sequencing. Plan where decoding, concerts, and elaboration will take place. Can you have a concert session at the end of a class and then a full period (or whatever is required) for elaboration the following class day? If not, how close can you come to having an integrated, logical, global presentation of the key concepts? Perhaps you have to reorganize the units to fit into the time slots available.

5. STOP. Do a final review of your outline to see how it "feels." If it "feels" good and you have gotten supportive feedback from your associates, then begin to plan for the first session. This first session plan will have to be very flexible because you do not at this point know very much, if anything, about the students who will be in the class. In this first session, you have at least the following goals:

a) Establishing a base level of knowledge for each student. This may be done by a pretest, through introductions, as a prerequisite for the course, by a pretest administered prior to class, by interviews prior to class, by biographies submitted prior to class or whatever best fits you and your time. You must have this knowledge, however, both to know how to proceed and to have each student and yourself see a base from which to measure the amount and rate of accelerated learning.

b) Establish a shared knowledge of the personalities, interests, fears, etc., of you and the students. This is important not only for setting a tone for sharing, but to give you additional clues as to student strengths upon which to capitalize and fears which may block learning.

c) Begin to remove the blocks to learning. Establish the climate of fun, openness and relaxation. You may need to spend a great deal of time in this area, or very little, depending on your subject matter and the students in the class. In an introduction to statistics for social science majors, you probably are going to have to do a lot of work on overcoming blocks. You might schedule a "bitch hour" where everyone lays down their worst experiences, feelings and expectations on how horrible statistics is. You might have everyone write a "statistics autobiography" to review and express all of the negatives (and possible positives) related to statistics. You probably need to connect the subject to their prior learning to convince them that they already not only know about the subject but have done well in some element of it.

d) Plan so that everyone has a positive learning experience as a consequence of the first class. The ideal is for everyone to learn something he or she did not think they could learn and for them to publicly acknowledge or share this revelation, at least by the second class. I frankly would suggest that you think a lot about this measurable first learning outcome and "guarantee" it by any means at your disposal. Use a clever trick...talk to a "magician"...use memory pegs...use the power of suggestion... repeat something so many times, in so many ways, with many subliminals, that there is no chance they will not know it. I think this is very important because your students are going to find your course "different"; probably fun and relaxing (as soon as they overcome their resistance to their barrier that learning is hard), but if they do not think they learned anything, then it will just be another of a long string of 'alternative' classes which are okay, but not productive. Remember that your students are there to learn, and even if they love the class, the bottom-line judgment will be made on whether they learned anything or not, so make them know they learned.

e) Do a relaxation and visualization if you are good at it and it is well tested on others.

f) Give the students a view of the course and of the method. They need to know enough so that they are both expectant of what is to come, and also never shocked or negatively surprised by what you will do in class. The conscious relaxation of students can be shocking to some. The music sessions can seem wierd. Establish a comfort level. Explain as much as you need to "take the edge" off of the strangeness. I believe in course outlines. I do not believe in the sharing of specific expected competencies in an outline, but I want my students to know what subject we will be covering when and to build up an expectation that they will complete the course with some good knowledge of all major course elements.

g) If you do not have high learning anxiety to deal with, all the above can be limited to some fairly extensive introductions of class members. You do not have to complete introductions in the first session, but it is good to have minimal introductions so everyone at least has a name and face to go by. I suspect, however, if I have the time, I will always have only two goals for my first meeting with the students: 1) get to know each other and set the tone for the course, and 2) have one specific learning outcome.

h) A critical element of the class "tone" is the setting of the norm that participation and making mistakes are the keys to learning not passive absorption, correct answers, or non-risk-taking behavior. You will be giving only affirmative feedback and will be making it not only okay to take risks and make mistakes, but essential to the individual, so that they feel good about themselves for taking risks and making mistakes, and less self-contented when they only venture safe, correct answers.

In my opinion, this first class is the most important, so I recommend putting more time into planning it than into any other section...remembering that whatever you plan has to be flexible because you generally do not know enough about the human beings in the class to know specifically what you should do.

6. Now you should repeat the whole process outlined in steps 1-4 above for each unit. Follow the Lozanov guidelines about giving each unit more information than most individuals would expect to learn, knowing that you can be sure the unit is learned through extra activations in the first few sections and through review. Typically what will happen is that it will appear slow at first and then accelerate as the students become comfortable with the method and begin overcoming their blocks to learning. Determine the global and specific goals for that unit. How will you measure them to demonstrate learning to the students and to you? What elements have to be included to reach the goals; in what order; in what format...Why? Remember you have to have both a global presentation and a developmental sequence.

7. How specifically can you best decode this unit? What are the critical concepts or terms you want to introduce to the students to lay the foundation for their learning the elements of the unit? What are the best forms of activations to establish these concepts or terms as memory pegs upon which to hang all of the information, both global and specific, that is required to thoroughly understand the whole unit? How many different senses can you use in a very short period of time to set out this outline? How little can you say, and how much participation can you elicit from each student given the short time frame? How can you best facilitate everyone's learning from each other as each person speaks or activates?

Note that you are not expecting the students to "learn" (in the sense of being able to say back) even the terms or concepts in the decoding, just as you do not expect to "learn" a table of contents. But you are building a framework as to what the unit is all about and are setting the key concepts about which "learning" will take place.

Consider what other elements you need to add to each decoding session (I prefer to call it introductory session). Do you need to establish more mutual trust; better interpersonal relations; deal with a learning block; reduce tension; have some hostility expressed; have some lighthearted fun; have silliness; have some review or prior learning reinforcement? In short, this is always a time to assess where you and the students are, and to deal with whatever issues may block the learning.

You may wish to consider relaxation, guided imagery, speak-and-listens, group discussions, small group discussions, a quiz, taking a break, a psychodrama, group therapy or whatever you are comfortable doing to deal with the issues. Most of the time you will probably be able to just go on with the coursework, but always be ready to deal with learning blocks, remembering that dealing with them can be a block to others who are ready to go on.

8. Write your dialogue or piece to accompany the music session. I will not go into detail at this time about the "art and science" of writing a dialogue, but a few thoughts:

a) Remember that you are simultaneously presenting a global unit idea, that this unit idea is part of the whole idea of the course, and that it is also made up of elements. Everything you present is important in itself, as part of a larger whole, and is composed of elements. Therefore, your dialogue should have everything needed to have the student learn the full unit, its elements and its relation to the whole subject.

b) I approach this by the same method that I use to outline the whole course or each unit of the course, steps 1-4 above. Outline everything which needs to be covered.

c) Ask yourself how many ways can you communicate the idea and list them for each element. See which work best for you and which are the most fun. Is it clear, fun, useful, complete, properly sequenced, absolutely necessary, etc. When in doubt, check it out with others, both "experts" and "naive" subjects.

d) See if you can develop a story line to link all of the elements together. Talk to a lot of others about it. Use your craziest friends. Do not be afraid to be a bit "far out," but constantly remember who your students will be. Everyone has a range of tolerance for "differentness" and you may wish to push the upper limits, but too "far out" is worse than not at all, because you will lose credibility and the dialogue will be discounted. Use graphics and visual imagery. Pre-introduce key concepts from Dialogue II in I, from III in II, etc.

e) Limit the dialogue to twenty minutes at least at first until you are sure the students can handle more.

f) Keep it as direct to the subject as possible. Carry on the storyline to make it interesting, but try to have each sentence relate directly to the information you are conveying. The goal is to have the students wanting to know what comes next.

g) Read the whole thing silently and aloud to yourself. Do you like it? Does it cover all that it needs to for you? Read it aloud to others and see how it feels and sounds to them. Have an expert in the area check it for errors. Then, based on the dual judgment of is it fun, and does it have all the important information correctly stated, revise it.

h) Choose your music to carry the feeling you want the dialogue to convey. Practice reading it to the music. Now how does it feel? Read it to the music to someone else. What do they think? Does it flow, does it fit? Read as if your voice is one of the instruments. Tape yourself and play it back. Practice just as you would have to if you were the concert master in an orchestra. You are the concert master.

9. Plan out the elaboration (practice session). What is unique about this unit? How does it relate to the whole course? What are its elements? Is there a logical progression of knowledge, a logical beginning and/or a logical end? How can I best have the students experience this knowledge? How many different ways (different senses utilized) can we experience this material? How many different ways do we need to experience to learn it? Sometimes it is better to do one activation thoroughly rather than having several quick-paced activations. How much repetition is required? How heavy are the potential blocks? What will be the most memorable and fun? Can I use any traditional methods somewhat modified to make them nonthreatening and fun, eg., solving problems, but perhaps collectively in small groups? Can I use the dialogue in a creative way? Is there anything in a helpful textbook or other traditional sources of information?

Review all techniques used in accelerated learning courses. Review all techniques used by traditional and nontraditional educators to activate learning.

Be sure you thoroughly test each activation. Why are you using it? How does it work? Are you comfortable with it? Is it fun for you? Test it on others. Is it fun and educational for them?

Finally, review the entire elaboration. Does it hang together? Is it properly sequenced? Are breaks included and does it have a good rhythm? Remember that all high energy, active involvement games can be as tiring or boring as a monotone. Perhaps the best rhythm is one which varies the tempo, intensity, playfulness, tension, etc.

How much room is there for questions, discussion and other "random acts of violence" from the students? Remember that you are only setting part of the pace for the course. A great deal of the pace will be set by the stu-

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dents, so a fair amount of time has to be made available to deviate from your agenda. If you plan for these deviations, then you will not experience them as "violence" to your plans because you will be assured that you can cover all of the activations in the time allotted. You also know that you can either let people out early, or cover additional material, or do a review (if needed) when you complete all of the material in your outline without the interruptions. This extra time will convey the acceleration to the students.

So, plan to cover all of the material in three quarters of the time allowed. You and the students can only win. You and they will be more relaxed and learning will accelerate even more.

10. Plan some form of concrete, measurable review for each unit as a learning reinforcement and as a criterion for comparison to nonaccelerative learning. In my opinion, these self-exams should be as standard as possible without having the ominous overtone of "test." if the tests are standardized, you can then compare the results to results in nonaccelerated courses and, equally important, your students can compare to verify their acceleration. I firmly believe in research, and standardized tests also give you the ability to compare your classes to other similar classes, using them as approximations to control groups.

You will have to judge whether the best reinforcement of learning comes at the end of the elaboration or before the next introductory section. Some material is best reinforced immediately, some after a delay. You will have to experiment to see which is best for you, your students and your subject matter. The important thing is to have the students and you know that accelerated learning is taking place. These tests, of course, should be self-testing for the students and have nothing to do with a course grade.

If the majority of your students do not seem to be doing well on their self-tests, I would talk it over immediately with the students in a positive, fact-finding way. Not what is wrong, but what are feelings about it...what are explanations for the situation. It could be that everyone feels really great about their level of learning and could care less about a test score. That is fine for learning, but it certainly plays havoc with your research. If you perceive that there is a problem, immediately consult someone who knows about accelerated learning. Review what you are doing in detail and have the other person help you troubleshoot. You might tape a session or two and/or have the students write a brief report on what they see happening in the class. I wouldn't worry too much about low test scores because you know that you are a good, competent teacher and that the learning is taking place. What you need to do is find out you can better accelerate the learning and get the acceleration to be demonstrated by some objective measure.

One problem might be the test itself. Or, perhaps students haven't been able to translate the global ideas into the specifics required for a test. Perhaps there is a confusion of terms or something simple like that. The main thing is to get help from a person experienced in accelerated learning.

If you have to turn in letter grades for students, I recommend the following: Each of the self-tests will give you and each student a measure of progress. The majority of your students should have complete knowledge of each unit presented or you wouldn't be going on. You would be doing more activations, revising your game plan, dealing more with blocks or whatever you and those with whom you consult see as indicated. Therefore, each student and you should have a good idea of the student's progress. If there are specific problems, see what you can do to deal with them. Then at the end of the course, give a final examination which is composed of the material they have already covered in their self-tests. Naturally let the students know this in the first or second session as there will always be some anxiety about grades. Let the student take practice final examinations if they wish. Let them create their own practice finals, however, both as a training device and to save you some work. I always believe in self-grading as a learning tool, but also one which saves me work. If you use this method of grading, there should be no surprises for the students. You can write a good standardized final exam modeled on the self-testing exams, students will get their expected grades and you will have standardized results for research. I would probably relax the students before the exam and seriously consider a take-home final of limited length and with an honor system of maximum mutually-agreed hours which can be spent on it, if the subject matter lent itself to that format.

11. Pretest your course. This pretest can be done in whole (the best) or in part. It can be done on a whole class or on selected friends. But pretest as much as you can and revise it based on the feedback you get. Ideally, your pretest would measure whether the learning was accelerated, but you will probably have to settle for a pretest which removes any major glitches and allows you to fill any major gaps.

Three Inviolable Rules:

1. Don't do anything you aren't completely comfortable

doing.

2. Practice, practice, practice until you are comfortable.
3. Never work alone.

*** *** ***

Cómo desarrollar un curso de no-lenguaje mediante el uso del aprendizaje acelerado.

Este es un bosquejo paso por paso para profesores experimentados en SALT para usarlo en proyectos preparados y materiales de curso. Este cubre ideales de curso, planes detallados, secuencia, ensayos, preliminares, codificación, sesión concertada, elaboración, auto- test y generalizaciones.

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Voici un programme structuré qui pourrait servir aux professeurs qui s'y connaissent déjà aux techniques de SALT mais qui auraient besoin de plans de cours et de matériaux. L'auteur fournit des exemples de buts de cours, plan détaillés, séquence, essais, préliminaires, décodage, séances de concert, élaboration, auto- tests et globalisation.

Der Gebrauch von beschleunigtem Lernen in der Entwicklung eines nicht-sprachlichen Kursus.

Schritt-für-Schritt-Umriß Erfahrenen SALT-Lehrern wird ein Schritt-für-Schritt-Umriß dargestellt, der beim Planen und bei der Vorbereitung von Kursmaterialien benutzt werden soll. Kursziele, im Detail erarbeitete Pläne, Sequenzen, Lehrversuch, Durcharbeiten, Selbstüberprüfungen und Globalisierung werden behandelt.

J. of the Society for Accelerative Learning and Teaching, 1983, 8(3&4)

Toward a Taxonomy of Methods for Improving Teaching and Learning*

Win Wenger

Abstract. A classification system or taxonomy is proposed to bring order to a field which is already asprawl with 350 known methods for substantially improving teaching and learning, and to help orient researchers toward some possibly productive lines of inquiry. The "A" dimension consists of five "meta-strategies," of which just the first meta-strategy is summarized in this paper. A "B" dimension of the proposed taxonomy is goal-oriented and evaluative. The number and variety of improvements to teaching and learning may well come as a surprise to most readers.

Most educators probably are not very surprised that there do exist some methods of teaching and learning which are clearly superior to those in general use in American classrooms. What may be surprising however, is the number of such methods, their diversity, and the disproportionate margin of superiority of some of these methods.

The writer has been collecting, and occasionally inventing, such methods since 1962. He has more than 350 methods in very wide variety, varying orders of complexity and some overlaps. He has sought to find order in this field by making a classification system or taxonomy, the subject of this paper. If this paper is of use to readers as well as to this writer, so much the better.

The present draft of this taxonomy reflects the biases of the writer's experience. Its general usefulness will be improved when other researchers rework it into a form not only better balanced but more dynamic. In a dynamic taxonomy such as the periodic table of the elements, a structural logic highlights gaps in information, and enables useful predictions as to where more discoveries can be made. This initial draft of a taxonomy may serve a useful purpose in bringing some initial order to a picture which hitherto had evidenced confusion.

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*Presented at the 1983 SALT Conference in Ames, Iowa.

Some readers have been drawn to some particular improved or promising method or system simply because it appears to provide possible improvements, only to find that in their own particular instance the one method yields at best only marginal benefits. These readers may be heartened in their inquiry by learning that not only do alternative methods and approaches exist, but there are alternative kinds of methods, few of which are bound to impact productively, right in their own particular teaching situation.

Even the modest clarification afforded by this draft taxonomy appears likely to expose promising areas for useful research to researchers, and to give rise to at a few dynamic predictions as to where further discoveries can be made. We trust that this paper will also render the diverse reaches of the field accessible enough to meaningfully expand the search for synthesis and synergy between methods.

Details and references for every one of the 350+ methods are beyond the scope of this paper, indeed beyond the resources of this writer (1). since these would comprise not just a full dissertation but a multi-volumed encyclopedia. Rather, we provide here just enough detail on a few of the methods to generate a representative feel for what is entailed and with a few references wherein the reader can begin to investigate further in such particular directions as interest him/her.

The seminal work of Dr. Georgi Lozanov, known variously as Suggestology, Suggestopedia and the Americanized "SuperLearning," will be barely mentioned here since this meeting's participants are already here in that context, and because nearly every other paper presented here will treat with some aspect of that work. Here we simply acknowledge that Dr. Lozanov may well be the most seminal educator since Socrates and Plato, and that the Suggestopedic learning method is probably the best presently available system, by most relevant measures, for memorizing large quantities of information. In this draft taxonomy, it is practical to turn most of our attention in other directions in view of there being at least 350 other such methods and systems of methods for improving teaching and learning; most of these approaches are highly different from one another.

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(1) Those resources further were taxed by one fire and two instances of massive physical theft of stored papers and notes.

It may be helpful to consider the following classifications as if they were bags, or loose baskets, of particular methods, or as if they were general strategies to improve teaching and learning, with each particular method one particular tactic among many for implementing that strategy. Of course, our task is made more complex by the fact that many of the more successful particular methods or sets of methods incorporate more than one of these strategies, as well might be expected since the ability of a system to wield several different complementary strategies would tend to improve its chances of success.

Meta-Strategies

Since first proposing this paper and presentation, the writer realized that his initial layout of strategies could be improved by some further sorting into sets of strategies. Further, such improvements in this taxonomy are expected and hoped for. As of now, these are the five "meta-strategies" or major groupings of strategies:

1. Improved methods by which the teaching is delivered or by which the learning is achieved.
2. Methods by which to improve the learner.
3. Methods by which to improve the teacher.
4. Methods by which to improve the context and/or setting within which the learning occurs, such as improving the school and/or school system, improving the household, community/noosphere/media community/noosphere/media, whatever.
5. Improve the content of learning; much of this usually revolves around either some developmental stages theory or around some cognitive unifying structure. For the latter, the General Theory of Systems now seems to be the best available candidate.

We will call this breakdown of methods and strategies the "A" dimension in this taxonomy. Nearly all the remainder of this paper will deal with this A dimension.

Most of the writer's experience, and hence most of this initial discussion, orients to the first two meta-strategies. Since the writer has already drafted a paper which accounts for much of the second meta-strategy, a taxonomy of 150 methods for significantly increasing the learner's apparent intelligence (2) most of the present discussion will center on the first meta-strategy above.

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(2) Privately published; available among the papers at this Conference.

Evaluation standards and goals. Mapping across the above five meta-strategies and across the strategies and methods listed below, is the dimension of purposive evaluation. We will call this Dimension B. A method for improving teaching and/or learning matters only if it improves learning and deserves inclusion in the listing in this investigative field, if:

1. It improves the quantity, range, rate, depth, creative grasp, usable transferability, and/or quality of learning in the short run. In the long run, such gains are permanent for the learner.
2. It gains more than it costs or loses in other valued qualities of the learning experience and/or learner, i.e., if the learner thinks or perceives or feels better as a result of the experience; if the learner's integrity has been supported or improved or at least not assaulted; if various personality-trait improvements are found to relate to the experience; if the net experience has been found to be pleasurable and/or rewarding; if standards of truth and high-quality inquiry are respected or supported; including standards of behavior and quality of style and/or the learner's ease of transacting with his fellows both in and beyond the immediate learning space, etc.
3. The method is easy to transmit and be learned, and if the number of teachers and learners who are able to use it successully is high.
4. The types and contents of learning for which the method is best suited are known.
5. The types of learner for which the method is best suited are determined.
6. The types of teachers who can expect the most success with use of the method are ascertained.
7. School, home, and community characteristics related to the method are discerned.

While on this dimension, the writer asks the reader to seriously consider the thesis that not only is what actually happens to the learner an important measure to consider, but that it is the only real standard ultimately. Despite much rhetoric to the contrary, the educational reality has been very much otherwise the past few decades.

For example, at conferences, the writer is often asked to evaluate some particular special program, usually a program for gifted learners. The following verbatim exchange is typical in this writer's experience thus far:

Q. "Dr. Wenger, I've just started a gifted-and-talented program in my school. We've got the latest audio-visual equipment budgeted to $10,000, and closed-circuit random-access information retrieval system, redundant tie-in to the community college's computer, and we've started building a 30,000-volume library with SRA and Title ___ funding...I need your advice on how to evaluate our new teaching program."

W. "How about evaluating the program in terms of how well the students in it advance?"

Q. "Huh?"

W. "Why not evaluate the program in terms of how well the students who are in it learn?"

Q. "Huh?"

W. "Isn't that what your program is for in the first place? For the students' gains in learning? Why not evaluate the program in terms of how well they learn in your program?

Q. "Huh?"

To the extent that schools, teachers and programs fail to evaluate in terms of the gains by their students, other considerations take the place of those students' educational well being. If that failure is, indeed, as widespread as the writer's experience thus far indicates, then need we look much further for the general state of difficulty in American education today? Conversely, what would happen if educators were paid, not for holding positions or for holding X amount of students in classrooms, not for 101 other considerations, but for how well their students learned?

The remainder of this present draft treats the first meta-strategy, leaving the remainder of this field to other papers and/or other researchers.

Methods and Approaches

Meta-strategy #1: Improved methods by which the teaching is delivered or by which the learning is achieved.

1. Specific methods to create learning:
   a. Bring to the conscious level what the learner already knows, then integrate whatever learning remains to be done, by whatever method, around that already-known core. The surprise here is just how much is already known by the learner even of subjects or skills he or she supposedly is learning from scratch--perhaps not the 100% postulated by Plato and Socrates, but a clear majority!
      1) Another description of this key principle of approach: Induce an experiential prediction in the learner of what the desired proficiency would be like--actual cognitive, aesthetic, sensori-motor and kinaesthetic information

(which derives readily from right-brain scenario-type methods). It is important to distinguish this approach from the positive-thinking or psycho-cybernetic approach whose efficacies are also often attributed to right-brain functions. Both approaches often use visualization, but the present innate learning approach uses visualizations to discover information and understandings, the psycho-cybernetic to impose desired outcomes. The purpose of most of the psychegenic methods and processes from which most of the innate learning methods derive, is to create a space wherein your more comprehensive consciousness can surprise you with new perceptions. A full dozen of these Innate Learning Methods, and other additional methods utilizing other strategies, are to be found in *An Easy Way to Speed-Learn* (Wenger, 1981). Most are also found in *Your Limitless Inventing Machine*, (Wenger, 1978).

2) The traditional Socratic Method, despite the difficulty of finding teachers capable of asking clever questions to induce the learner to discover his world and himself through observation and introspection, based on early forms of this principle, lent enough advantage to give education its very name, "educare,"--to draw forth. It was only in the industrialized 19th century that education became reconceptualized upon "tabula rasa" or blank tablet, pouring information into otherwise empty heads, which model dominates educational practice today.

Strategy #2: Improve Temporary Conditions in the Learner (as distinct from actual improvements in the learner, meta-strategy, as in the article following below. See also pages 210-11 below.).

1. Improve learner confidence, *a la* psycho-cybernetics and positive thinking (see above) and as per some elements of the Lozanov method.
2. Reduce stress and noise (entropy/disorder) in and around the learner to improve signal-to-noise ratio. This includes:
   a. Physiological factors--look to diet, methods of reducing food allergies and congestion, improving sensory disorders. Naturopathic medicine and holistic health practicioners can be excellent sources of information in this regard despite some apparent need to sell. Meditation and breathing exercises from yoga, and especially the "Calm-Breathing Patterns" exercise from *Beyond*

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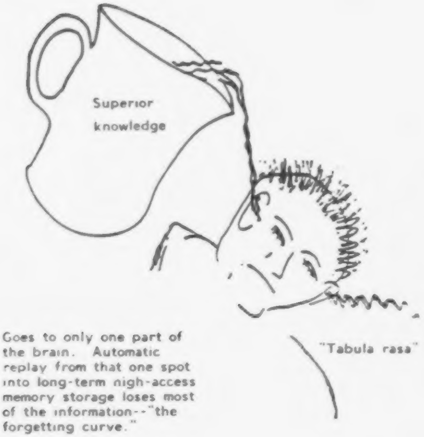
CONVENTIONAL LEARNING:



Goes to only one part of the brain. Automatic replay from that one spot into long-term nigh-access memory storage loses most of the information--"the forgetting curve."

"Tabula rasa"

Figure 1. Mainstream educational method since the 19th Century, based on the earlier "tabula rasa" philosophy of James Hill and James Stuart Mill, who believed Man to be infinitely perfectable. Theirs was intended not as a system to fail people by, but a way to lift everyone, even the bottom-most, to the very top.

    Okay (Wenger, 1980), are particularly designed to reduce internal noise, so that the desired information stands out better against the cleaner background.
  b. Remove emotionally-based learning blocks. A simple procedure for this in An Easy Way to Speed-Learn (Wenger, 1981), which takes about five minutes to accomplish.
  c. Smoothness of presentation and the learning environment. Although a teaching method rather than a direct influencing of the internal state of the learner, this may considered here because of its use of the same principle from information theory of signal-to-noise ratio. To the writer's knowledge, the only place this aspect has yet been discussed is in the SALT Journal (Wenger, 1976).

3. RNA/DNA nutritional supplementation and other biochemical methods for improving learning performance temporarily. Vitamin A, the combination of glutamic acid with Vitamin B-6, and high dosages of folic acid are among the natural nutrients which appear to be associated with such desired effects.
4. Machine-enhanced learning methods, including interactive computer techniques and, possibly, the effects upon learning by the learner's use, before and/or during, of the Whole-Brain Waveform Synchro- Energizer, which entrains cortical response, invented by Dr. Denis Gorges of Cleveland, Ohio.

Strategy #3: Reinforce the content of learning to involve more of the learner's brain and mind. A sufficient diversity of regions of brain or mind inputted with the same information, and the brain's natural response into high-access memory storage will produce information gain instead of the familiar information loss of the forgetting curve (so familiar, in fact, that education itself has been defined as "what you have left when you've forgotten everything you've been taught."

1. High information technology and audio-visuals, a multi-sensory way of feeding the same information simultaneously to different regions of the brain. Because of the cost and therefore sales potential of high tech, this appears to be the one area of methods for improving teaching and learning for which conventional education displays any awareness.
2. Alternating attentive, non- attentive, and inattentive-with-baroque-music-background, the Lozanov

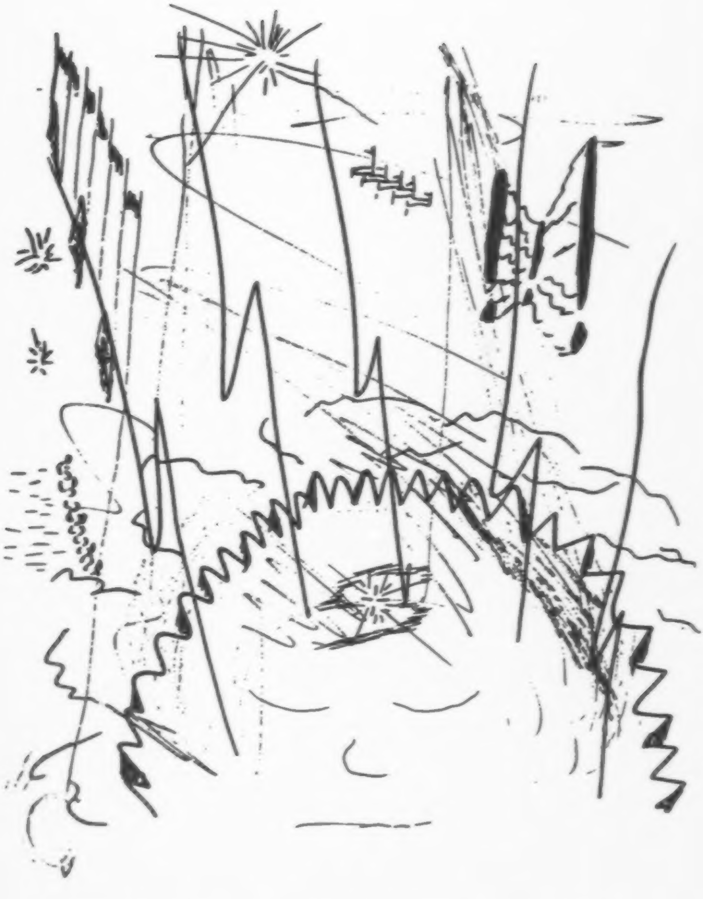


Figure 2. Socrates, Plato, and more recently, Project Renaissance, among others, seem to have found that a well-nigh-complete universal hologram is already in the learner's head. Not only does this hologram provide some interesting internal "reading," but it seems to be the easiest and most direct route to learning even the most formal educational content.

Suggestopaedic method of putting information into the learner, appears to route the same data to differentiated regions of the brain even more than do audio-visuals, since the latter only reduce the rates of forgetting while Lozanov's method results in that rather startling negative forgetting curve, wherein the longer one goes after the learning session, the more he or she remembers from it. Instead of losing data during replay to high-access storage, these differentiated regions of the brain appear to fill in each other's gaps to arrive at a more accurate and complete memory. This hypothesis needs confirming by stereotaxic EEG or by thermography, the behavioral evidence can carry only so much weight.

3. Neuro-linguistic Programming, now readily found in nearly every major American city, finds somewhat similar improvements in learning performance resulting from a mult-sensory teaching mode both respecting and compensating for each student's having his or her own preferred sensory modality in which to learn. Neuro-linguistic Programming, or NLP, alongside of Lozanov/SALT, Sophrology, and this writer's Project Renaissance, is one of several major diverse systems of methods encompassing diverse approaches to improving teaching and learning, and also extending far into other ranges of human affect as well. To know those four systems is to know a majority of the field as it exists today.
4. Hard-core behaviorist psychology itself has given rise to several excellent interview methods for comprehensively reinforcing the content of learning, not only to unforgettability but to near- perfection. These methods yielded some excellent results, but had the misfortune to come in while behaviorism was going out of style, and thus are virtually untouched by American education today. Probably the most noteworthy of these interview technique teaching methods was developed by Ferster and Perrott (1969).
5. Playing mind games with the content of learning, a Synectics-like mental playing in the context, finds new modes of perception/conception through which to experience the structural core or essence of the targetted learning. Synectics became known for, among other things, studying matters of chemistry by imagining oneself to be, and picturing/sensing/feeling oneself to be, a molecule caught up in the Brownian Dance. In the TAVIT procedure (from An

Easy Way to Speed-Learn (Wenger, 1981), math students are urged to experience themselves being an inchworm the length of pi, chasing his tail around and through a circle, as one way to "dig" mathematical laws describing dimensional relationships of circles. Synectics today can be found in two somewhat rival firms in Cambridge, Massachusetts.

6. Straight mental practice of some skill, such as tennis or the shooting of basketballs, as described in many sources and generally found to be almost as effective as live physical practice of that skill. In this writer's experience, the best gains in this quarter are usually to be made in terms of spacing mental and live physical practice of the same skill in rapid alternation of sessions ranging between 5 and 15 minutes in length.
7. Instant Replay to reinforce just-exposed learning. One source of methods of Instant Replay was by Raymond Hill Cameron (1983). The writer has worked with, expanded on, and developed alternative methods toward this effect, which are in privately-published papers and which will be incorporated into the next edition of An Easy Way to Speed-Learn.
8. Mental imagery devices to reinforce ongoing learning, such as described by the writer in the SALT Journal 1 (3), p. 234. Accompany physical acts with an appropriate accompanying mental image, such as the football lineman's becoming a giant cutting axe, but also accompany mental acts with appropriate fantasy images. For example, in An Easy Way to Speed-Learn (Wenger, 1981), students are advised to imagine their own head to be a large parabolic radar dish at least a yard from ear to ear, focussed on the lecturer or text, or task at hand. This focussing technique produces startling subjective effects, but its impact on formal learning has not yet been formally assessed.

Strategy #4: Taking advantage of innate traits and characteristics of the learner, until now overlooked by American education, to bring about learning in new and productive ways. For example, Neuro-linguistic Programming's discovery of preferred sensory modalities in learners, mentioned above, or Psychegenics' discovery of ongoing spontaneous visual mental imagery in every individual, and of some of the ways to utilize this neglected spontaneous imagery to bring specific new information conscious.

1. Specific techniques of memory enhancement--
    a. Lozanov-based learning, Suggestopedia or SuperLearning, which in part may be described as a patterned way of putting information into the learner in a way which meshes with the nat-

ural patterns or rhythms of his mind or brain, which meshing steers the information in such a way that it is easily retrieved from memory. (See also discussion of holographic/holophonic/ flow theory below).

  b. The writer's "Tape-Space-Replay System," dating from 1961 (Wenger, 1961). To memorize vocabulary, for example, take some 20 items at a time. Record the item on blank tape, continue recording blank for 5-10 seconds, then record the translation, then go on to the next item. In playback simply try to provide the translation before the tape does. Any items missed can simply be included in the next batch of 20. Effective for short-term memorization; long-term memory rates from this procedure are not known at the present time.
  c. "Grocery List," Harry Lorrayne's "Memory Pegs," and other such specific mnemonic devices. "Pegs" is a lot of work to learn but once you have your basic cross-indexing system, apparently one can demonstrate prodigious feats of memory. "Pegs" is taught by any Silva Mind Control instructor; that program is found in any major American city or at its homebase at the Institute of Psycho-Orientology in Laredo, Texas.

2. Flow and Feedback:
   a. The theory of spontaneous learning, Ramon y Cajal, in brain histology and neuroanatomy; Maria Montessori, in education and as derived from centuries of the work done at the University of Pisa; Omar Khyyam Moore and his Responsive Environments Foundation, among others.

      Other things equal, learning comes best as feedback from one's own activities, especially one's own spontaneous activities. Justification for playfulness; learning by doing; democratic schooling methods. Play itself is seen as a sapience-wide method for discovering the pattern of how things work, and pitched to the strategy of eliciting those surprises which most extend our perception of the patterns of how things work.
   b. Contextual/wholistic approaches to learning. This is in contrast to current general practices based upon breaking information and skills down into tiny separate bits (and validated through tests orienting toward whatever yields marginal improvements in temporary memorization of bits such as nonsense syllables). The Brain/Mind

Bulletin (3) is an excellent beginning point for finding diverse studies indicating that learning naturally and best proceeds from whole patterns to details.

c. Flow to get more feedback. Conventionally, when one is learning a new skill, he tends to proceed very carefully, not allowing much to happen and therefore not allowing much feedback (or learning) to happen. Generate a rich continuing flow of relevant activity, and the resultant enriched feedback modulates the flow at its margins, produces learning.

d. A new holographic theory of creativity, extending No. 2 above. Apparently either the universe itself or the way our perceptions happen to work in the universe is on the model of the holographic principle with richness of perceptual detail caused by intermodulation between a referent beam or tone or stream, and that beam's split reflection from content. Establishing a continuous flow of creative activity, naturally develops a standing wave effect or pattern into which drops or emerges increasingly elegant content. An example is the Improvitape Technique (privately-published papers by this writer) which enables apparently anyone who can play a musical instrument to very rapidly become a high-quality, creative musical composer. The holographic theory of creativity, which is still being developed and whose descriptions at this time are therefore unintentionally rather cryptic, emerged from a forum, chaired by Professor John Gowan (ret.) of Westlake Village, California, at the June, 1983 Creative Problem-Solving Institute, and participated in by Dr. Sidney Parnes, recently-retired president of the Creative Education Foundation, and by Dr. George Ainsworth-Land (author of Grow or Die), and by this writer among others. A paper on this new holographic theory of creativity may be expected from at least one of the participants within the coming year. This writer's impression is that once this theory is developed in the area of creativity, that its implications for learning will force its rearrangement in this Taxonomy as a major strategy, possibly even as a meta-strategy.

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(3) Brain/Mind Bulletin, Interface Press, P.O. Box 42211, Los Angeles CA 90042, Marilyn Ferguson, Editor. Published bi-weekly as a summary of findings and references on ongoing research into nature and function of brain and mind.

Strategy #5: Patterning the Learner into a Better Learner: Discover and internalize the relevant characteristics of extraordinarily successful learners.

1. Biomonitoring, and eventually biofeedback training, the physical and brain responses of genius contrasted to generality.
2. Modeling, across broad spectrums of largely unconscious patterns of response, upon the characteristics of genius:
   a. by Neuro-Linguistic Programming methods,
   b. by methods of *An Easy Way to Speed-Learn* and by this writer's new "Transformation Technology" (Wenger, 1982). It has recently begun to seem apparent that subtle patterns of muscle stress (body English), many of them continuing within the body of an individual for many years, powerfully inhibit or facilitate that individual's response and ability to respond to various kinds of stimuli or situations. These patterns can now be identified and shifted, at least temporarily.
3. From this taxonomy the writer predicts the eventual discovery of additional potent systems, wherein the knack of being an outstandingly excellent learner is identified and transmitted.

This completes this first sketch of the first Meta-Strategy, wherein may be found headings for the listing of improved methods by which teaching is delivered or in which learning occurs. The problems of overlapping classification associated with the earliest stages of creating a taxonomy are amply demonstrated in the above, not least of all by the tendency of the last several entires above to begin to verge on the second Meta-Strategy, that of improving the learner himself. That second Meta-Strategy is fully as comprehensive an area of investigation as is the first one above and includes already, as mentioned before, another taxonomy by this writer, sorting among 150 methods simply for increasing human intelligence, to say nothing of other factors of human quality and learning performance.

Upon closer investigation, it may well be that Meta-Strategies 3, 4, and 5 may also each prove to be as extensive and as richly filled with possibilities.

What is immediately apparent to this writer, even with Meta- Strategy 1 sorting 350 known methods, that probably as many other methods are known of which this writer does not yet know. Presenting this initial draft of a taxonomy may well help bring them to light and access. It is also probable that all these taken together in turn are a drop in the bucket compared to the methods it is immediately possible even now to develop.

The numbers can be even somewhat daunting. For example, this writer has a dozen different specific methods for just the A-1 strategy heading alone, and is looking at program elements which would easily be combined into hundreds of different specific methods for just that one entry. Evaluating and weighing among these (Dimension B) to get the range of selection back down to manageable proportions, is strongly needed even in this early phase of development of the field. The numbers may be daunting, but the possibilities are exciting, since several of that first dozen methods consistently yield a rate of apparent acquisition of conceptual learning several hundred times greater than that found from conventional methods. And this is just a beginning.

Whether daunted or excited, those of us who as professionals have the responsibility for nurturing and encouraging the development of other minds and intellects and human beings, have the responsibility of finding and pursuing the best possible ways to encourage that development. Perhaps that is our responsibility as human beings even more than it is our responsibility as professionals.

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Hacia un taxonomía de métodos para el mejoramiento de la enseñanza y el aprendizaje.

Un sistema de clasificación o taxonomía es propuesto para traer orden el cual está ya distribuido con 35 métodos conocidos para un substancial mejoramiento en la enseñanza y el aprendizaje y para orientar los investigadores hacia algunos campos posiblemente productivos de investigación.

La dimensión "A" consiste en 5 estratégicas metas de las cuales solo la primera es resumida en este estudio. Una dimensión "B" de la taxonomía propuesta es el ideal orientado y evaluativo. El número y la variedad de los aparentemente productivos mejoramientos al enseñar y aprender, pueden venir como una sorpresa para la mayoría de los lectores.

Vers une taxinomie de méthodes pour l'amélioration de l'enseignement et de l'apprentissage.

On propose un systéme de classification, ou une taxinomie, afin de mettre ordre à un domaine où on connaît au moins 35 méthodes différentes qui améliorent considérablement l'enseignement et l'apprentissage. En même temps ce système de classification peut aider à orienter les chercheurs dans leurs enquêtes et à rendre ces enquêtes plus productives.

La dimension A comprend 5 méta-stratégies dont ce rapport ne présente que la première, en résumé. La dimension B. de la taxinomie proposée s'oriente vers un but et vers l'évaluation. Le nombre et la variété de ces améliorations manifestement productives apportées à l'enseignement et à l'apprentissage pourraient bien surprendre la plupart des lecteurs.

Über eine Taxonomie von Methoden für das Fördern von Lehren und Lernen.

Ein Klassifizierungssytem (oder Taxonomie) wird hier vorgeschlagen, um Ordnung in ein Gebiet zu bringen, das schon mit 35 bekannten Methoden für eine beträchtliche Verbesserung des Lehrens und Lernens weit gestreut ist. Es soll Forschern helfen, sich nach einigen wenigen möglicherweise produktiven Fragenrichtungen zu orientieren. Die "A" Dimension besteht aus fünf "Meta-Strategien," wovon nur die erste Meta-Strategie in diesem Papier zusammengefaßT wird. Eine "B" Dimension der gebotenen Klassifizierung ist zielorientiert und behandelt Berwertungen. Die Zahl und Vielfalt der scheinbar produktiven Verbesserungen im Lehren und Lernen können den mesiten Lesern eine Überraschung bieten.

J. of the Society for Accelerative Learning and Teaching, 1983, 8(3&4)

A Taxonomy of Methods to Increase Human Intelligence

Win Wenger

Abstract. This is a summary listing of physical, physiological, mental, and developmental methods, some proven and some speculative, that increase human intelligence. The article is intended to provoke discussion and research.

Not just one or a few, but at this writing 150, methods are now known to produce gains in apparent intelligence, each one resulting in IQ gains (among other things) ranging between 10 and 25 points. Several hundred additional procedures are known which appear to marginally improve intelligence, usually in combination with some one or other of the 150 known main methods.

These methods are very thinly scattered across the professional, para-professional, and potentialist landscapes. No one has ever pulled more than a very few of these methods together. Yet most of these methods reflect complementary differences whose combination promises a positive synergy ranging far beyond the mere sums of the (IQ and other) gains by the separate methods.

The potential impact of most or all of these methods taken together may be somewhat lessened if some of these 150 methods are simply different ways of bringing the same set of specific mental and brain functions to the same point of proficiency. However, the large differences among these 150 approaches indicate more complementarity than redundance--with positive synergies therefore in prospect.

The prospective gains also extend well beyond those simply of increasing intelligence. Many of the cross-linking methods and approaches also improve insightfulness and creativity far more even than they do apparent intelligence, to the extent that these quantities can be compared. Many of the physical methods, and several of the mental, also produce or reflect other apparent health benefits.

Enumeration of each of the 150 separate methods is appropriate at least for a dissertation study, if not for a multi-volumed encyclopedia of research. It is also a task more appropriate to be pursued by many rather than by just this one writer. Rather than beg the question, however, we propose with this brief paper to begin a classification system, or taxonomy. This taxonomy can then lay out these methods in some order convenient for inspection, which may enable inquirers to address specific sectors to good effect.

Such a taxonomy will also convenience any program or institution which wishes to make a significant human difference in terms of repair of human potential, or which wishes to actualize such potential well beyond the present conventional norms.

The writer is currently engaged in forming a new university and in creating a set of developmental programs in association with that university. This taxonomy is intended to also guide and facilitate the carrying forward of these developmental programs.

This taxonomy is also intended, as did the periodic table of the elements, to generate predictions of where and what new elements may be found--in other words, to help generate new methods some of which may be far more productive of intelligence gains and other benefits than are any of the presently known 150 methods.

Some specific methods pertain simultaneously to more than one of the specific classifications following below. This effect may disappear as we develop a better classification system, or it may increase if this taxonomy suggests new methods whose heightened effectiveness is by the economizing strategy of working various types of effect together.

Here then, is the preliminary outline sketch of such a proposed taxonomy, with enough detail on just a few of the example methods to lend a feel for what the entire taxonomy may eventually become:

A. Physically-based methods
    1. Improve circulation to the brain, to increase the supply of oxygen, food-energy and nutrition, and improve the cleansing removal of wastes.
        a. CO2-enrichment to train the carotid valves and cranial circulation to open permanently wider.
            1) "baggie-breathing" (Wenger, 1975, pp. 26-30,50)
            2) underwater breath-holding, with underwater swimming exercises and games. (This was how this writer unknowingly, accidentally, strongly increased his own intelligence in 1959 while in summer school to make up academic deficits.)
            3) "sip-breathing" (Wenger, 1979, pp. 136-7)

    4) to limited extent, aerobic exercise and jogging (but not known to be one of the 150 methods yielding 10-20 points IQ gain)
    5) direct enrichment from bottled or dry ice CO2
  b. Nutritional ways to expand circulation, such as with the niacin flush (in combination with other means--not enough by itself for the 10^+ point IQ gain).
  c. Positional methods--such as upside-down-hanging (Delacato, 1983) or the "gravity position" meditation (Wenger, 1979).
  d. Unblocking circulation, and decongesting
    1) by "cleansing diet"
    2) by a certain nasal decongestant, Vasopressin, formerly available over the counter until it was discovered to increase intelligence. It may also have other chemical factors also helping to cause the IQ gains associated with it.
    3) anti-allergy treatments, and possible general wholistic or preventative treatments.
    4) medical and/or sugical intervention to remove specific blocks to circulation
    5) smoothing the flow of body energy
    6) correcting blocks to circulation of cerebrospinal fluid, of lymphatic fluid, of other body substances.

2. Various other physical approaches:
  a. Reduce physiological disorder or "noise," to improve the signal-to- noise ratio in the organism (Wenger, 1979, pp. 41-43).
  b. Cross-linking opposite or diverse regions of the brain building up communcations links in between by means of patterns of sound, of other patterned sensory stimulus, by magnetic pulse, and by cortical-evoked response. Auditory cross-linkage developed by Robert Monroe of Monroe Institute of Applied Sciences in Faber, Virginia; a more ambitious, multi-sensory, cortical-evoked Whole-Brain Wave-Form Synchro-Energizer device invented and developed by naturopathic physician Dr. Denis Gorges of Cleveland, Ohio and tested mainly in clinical settings.
  c. Linking the brain's appetite structures to sensory and intellectual and aesthetic functions, as appears to be the case with most exceptionally-gifted people.
  d. Cross-linking mental and select physiological patterns and orientations of response, as in the Arizona-based Genesa program as researched by the School of Education, University of George at Athens. San Diego Public Schools has used this for remediation.

e. Nutritional building of intelligence (includes RNA/DNA and folic acid, choline and/or lecithin; glutamic acid in combination with B-6; nutritional or brewers' yeast in tandem with heavy emotional, aesthetic or intellectual work; vitamins C and E for circulation; vitamin A for temporary improvements of sensory response and consequent mental functions; many other effects).

f. Specific chemical building of intelligence (including magnesium pemoline as distinct from pemoline; other effects). Nooprenyle.

g. Hyperbaric and hypobaric processing.

h. Arousing the visual circuitry (flick gazing) (Wenger, 1975, p. 75). Eighty percent of the brain is involved in visual response which, on the whole, is highly trainable.

i. Disinhibiting and smoothing visual tracking (visual tracking automatic responses are part of patterns of reflexive brain response), as means to disinhibit associated brain functions (as per study by a Dr. Jim Medvedev for Westinghouse Learning Laboratories, and as per studies since then by Neurolinguistic Programming and by Psychegenics). This is a much larger and more facile point of leverage upon patterns of brain response than at first it sounds.

j. Computer games, tachistoscopic and other device-assisted sensori- motor training approaches working toward speed, complexity, and finer discrimination of sensory stimuli together with correspondingly more sophisticated mental responses.

k. Fetal tissue perfusion techniques.

l. Sensori-motor patterned training (the usual more successful forms recapitulate and enrich the stages of phylogenetic, ontological and neurological, to say nothing of cognitive, development.

m. Bio-sensory identification of initial patterns of response in genius brains and bodies, with biofeedback methods to train these preferred patterns up in others not initially genius.

n. Identifying and shifting body-English stress-patterns, which are powerfully facilitating or inhibiting of response in many areas of activity and skill (the "Transformation Technology" of this writer's Psychegenics program).

B. Mentally-based methods:

1. Cross-linking opposite sides of consciousness (right and left brains, as in Wenger (1981). Finding and exercising activities which engage both opposite sides simultaneously, building communications

between the two sides and through everything in between.

2. Improving mental signal-to-noise ratio, as with meditation and as with the self-release processes found in Wenger (1979) and elsewhere.
3. Removing inhibiting blocks to intelligence and creative response.
4. Removing confusions, with and without bio-monitoring equipment, as in math, in word-meanings, and in sequential learnings.
5. The SAND program of methods (Wenger, 1980?) for sharply and easily improving language and language-related faculties.
6. Enriching cognitive structure
    a. a la Piaget and Bruner developmental models.
    b. philosophically integrative, as with math and with the general theory of systems.
7. Identifying, and modeling on, the response patterns (and micro- response patterns) of genius.
8. Re-orienting to play mode even in pursuit of serious purposes, to enrich feedback.
9. Identifying and revising habituated cognitive strategies.
10. Decoding and working more extensively in the languages of various portions of the brain as means to reprogram functions relating to quality of intellectual performance.
11. Training a strategy of alternating freely the two feet of the mind, as in Osbourne's model of suspending judgment to create freely, then judge freely; or as in the writer's model of freely using both narrow-beam articulated focus of faculties and the right brain general pattern-oriented faculties, in frequent alternation and together.
12. Training up undeveloped or unengaged freely-functionable regions of consciousness and bringing these to bear on matters in current consciousness. Building uninhibited satellite intelligences and then integrating these.
13. Working with expectation, self-image and suggestion.
14. Putting the nation's--or world's--greatest geniuses to work on the task of finding better methods to create genius.
15. Putting the best creativity methods and consciousness-involved methods such as the above (including the "Toolbuilder" methods of this writer), on the task of creating yet better methods for building intelligence and for creating genius.

C. Methods related to human development:

1. The general model of enrichment and therapeutic repair; stimulus and treatment at early sequential stages of development (Wenger, 1972, Chs. 6&7).

2. Catching peak periods of neurological growth, in fetus and perinatally, with nutrition-boosts and headphone/light-show stimulus.
3. Catching peak periods of personal growth and enriching them. Inducing such periods to catch them more easily for enrichment.
4. Improving the birth process--natural childbirth training of mother, vitamin E to improve oxygen efficiency in mother and fetus; antenatal decompression; drug-free birth procedures; LeBoyer-style birthing and immediate post-natal procedures.
5. Re-birthing by various means?--for repair and enrichment?

D. Theoretical areas for further inquiry:
   1. Brain-mind-computer linking?
   2. Re-routing (by surgery? by fetal perfusion techniques? by hormones? of circulation?
   3. Artificial intelligence?
   4. Changing the genetic code?
   5. Changing schooling?
   6. Changing incentives?
   7. Other?

This has been a bare-bones outline of some of the possible approaches to increasing human intelligence. Some areas are virtually empty of known methods; other areas, especially the first two, physiological and mental, and the headings under them, are literally jammed with many known specific methods, most of which are known to powerfully build intelligence and some of which also appear to do so although not yet scientifically validated. In several empty or near- empty classifications, the writer can already see a number of plausible new techniques which should be developed by experiment, which might well be equal in effect to at least some of the already- known, already-developed and supported methods--so that if the above taxonomical structure is as yet very far from ideal, it is already doing its job nonetheless.

Enough such methods are presently known and validated to be combined into a synergistic program powerfully building apparent human intelligence. How powerfully is unknown since these methods have, by and large, been thinly scattered and never before combined.

This initial sketch of an outline toward a taxonomy is for the purpose of beginning to clarify and define the field of improvement to human intelligence, and to stimulate further research. That further such research should be done immediately seems to this writer evident and urgent, if not imperative, with profound positive implication for human well-being in terms of the qualities identified with the experience of being human.

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Una taxonomia de métodos para acrecentar inteligencia humana.

He aquí una lista breve de métodos físicos, fisiológicos, mentales y evolucionistos, unos probados - unos especulativos, que acrecentan la inteligencia humana. La meta del artıculo es de provocar discusión e investigación.

Une taxinomie de méthodes pour faire accroitre l'intelligence humaine.

Voici, en résumé, une liste de méthodes psychologiques, mentales et développementales pour faire accroître l'intelligence humaine. On a déjà prouvé l'efficacité de certaines de ces méthodes; la valeur des autres n'est basée que sur la pure spéculation. Cet article a pour but de provoquer la discussion et la recherche.

Eine Taxonomie von Methoden für das Fördern von der menschlichen Denkfähigkeit.

Diese Arbeit ist ein zusammenfassendes Verzeichnis der physischen, physiologischen und geistigen Methoden und Entwicklungsmethoden, die die menschliche Denkfähigkeit fördern. Einige sind schon geprüft, andere sind spekulativ. Der Autor beabsichtigt, Diskussion und Forschung hervorzurufen.

J. of the Society for Accelerative Learning and Teaching, 8(3&4), 1983

Suggestive, Accelerative Functioning in Industry Training*

Otto Altorfer

Abstract. The author details his experiences applying suggestology in an airline company to various employee training seminars.

Industry is an environment with handicaps and limitations to try out and research new and especially risky things. By presenting some of my material to you, I look forward to feedback from people who apply suggestology in different settings and with a greater degree of specialization.

I feel respect and gratitude for this newly-discovered avenue of human development. For me, suggestology has become not merely another educational technique, it has influenced my life to a great extent and in highly beneficial ways.

For over 20 years, I have been familiar with the notion that normal successful people like you and me don't use more than five to seven percent of available mental capacity. I didn't believe it until 1978 when I became familiar with the compelling data about suggestology. Then I was certain; there is almost an unlimited supply of human reserve energy. Even if we don't accelerate human functioning in industry ten- or twentyfold but only double it, it would have startling effects.

If I only double the use of my energy, I either double my present success rate or attain it at half the effort. In both cases, I win, and with me, my organization gains. I got excited about the potential blessings of accelerated and enriched human functioning. I included accelerated functioning at work as a meaningful pursuit, adding it to my already-existing goal to make work a more joyful and harmonious experience through emotional fitness (Altorfer, 1977). To make this happen, I knew it had first to work for myself.

I. Formal Suggestology

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*Paper presented at the 1983 SALT Conference

I was impressed at the beginning with the concept of formal suggestology, e.g., to give simple and straightforward information in timed and concentrated ways, accompanied by the synchronizing effect of slow-paced music (Ostrander & Schroeder, 1979). To succeed in it, relaxation appeared to be, and is, a central and complex prerequisite. But I also knew well that I couldn't invite our trainees for a full week of relaxation at company expense. So at the very beginning, I decided to develop a progressive relaxation "super" tape (Altorfer, 1980), not only accompanied with positive suggestions before and after the practice, but also in the formal format hoping that progressive relaxation in suggestology format had a compound effect. And it had. Many people went subconscious. Often people started to talk about supernatural experiences after the practice. On the one side I was satisfied with the result and felt encouraged to try the formal approach on similar subjects. On the other hand, I was concerned; I soon started meditation training and the study of other approaches which appeared also to deal with the lesser known "darker" forces of the human mind. That's how suggestology invited me to learn much more about my own mind.

II. Creating "Suggestology" Atmosphere

From the viewpoint of methodology, acceleration of learning involves more than making tapes according to a prescription. Suggestology is more than a technical gimmick. I realized this when I started to reflect about the implications of Dr. Lozanov's formulated prerequisites (Lozanov, 1978) for applied suggestology, namely,

1. the absence of tension, and the state of joyful and relaxed concentration.
2. the concept of united or integrated mind activity leading to the harmonious functioning of the total mind, e.g., right and left hemisphere intellect and intuition, willpower and imagepower, etc.
3. the need to bypass, modify or desuggest already-structured, especially negative-structured energy, and to access the reserve complex at the untouched level.

That's a full order for practical application. It definitely shifts the emphasis from technology to human touch and contact. Here are some of our experiences:

1. Observations of emotional fitness training taught us that a state of joy and relaxation at work or in training can only occur through the voluntary cooperation of the participants. It cannot be forced. The absence of tension in this connection is parallel with an absence of dependency feelings or, conversely, the promotion and maintenance of autonomy, self-regulation, or self-motivation.

We use suggestology in seminars dealing with work relationships, people contact, and stress management for expert and senior staff. Participants of such seminars have already successfully fulfilled the work conditions at a contractual and enforceable level. Therefore, we have no problem in acknowledging that participants are experts with a great deal of experience, they already have proved their expertise, it's okay to learn or not to learn, the instructor presents data, participants decide which of them they integrate, but it is important to acknowledge these messages. And we invite them to take an active part in formulating seminar objectives.

Along the same line of self-responsibility, we encourage suspended judgment. The message here is:

> "Don't believe what I say unless it's supported by your own experience; neither disbelieve what I say unless it's also supported by your own experience."

We appeal to the quality of worklife in the sense that improved quality on a personal level will also positively influence the quality of work output. We invite participants to think of goals which add comfort, meaning and joy to their own personal functioning and to detach themselves from encouraging but sometimes too-anxious advice and expectations by superiors. "It's okay to get personal benefits out of this learning experience."

When work can be an enjoyable and gratifying experience, learning can be, too. We suggest that participants be aware of their feelings during the seminar, to avoid discomfort and to stick to positive joyful feelings. We establish the "right to pass" on all processes without justification or explanation, in order to overcome or avoid old resistances and resentments around learning situations.

2. The use of the total mind offers one of the biggest challenges for practical implementation in an industry environment because "holistic" applications do not enjoy great popularity here yet. I want to pinpoint some specific factors within this framework which we used with awareness and purpose, and which were received, acknowledged, and commented on by participants. They are:

- physical relaxation, such as progressive relaxation,
- rhythmic breathing,
- the use of music not only on tape, but also in the course of "life" instruction,
- the cultivation of positive thoughts and feelings through positive presentation of material and the practice of affirmations,

- the conscious use of nonverbal expression skills, such as body language, use of props, tone of voice, speed, intonation, pitch, eye contact, body posture, etc.
- greater involvement of the senses in general, and the acknowledgment and expression of feelings in particular,
- multisensory goal setting,
- creative visualization, imagery and the use of metaphors, etc.

3. The need to bypass or unlearn already-structured energy and to reach reserve energy at the untouched level is a condition which requires the neutralizing of existing thought and habit patterns, or at least involves the transformation of negative restricted thoughts and habits into creative positive ones. In one of our classes, the Work Relationship Seminar, we offer some basics in techniques to create new or modify existing but undesired thoughts or habits. In a way, I consider this as the final frontier of relaxation: negative thoughts and self-defeating habit patterns are at the root of excessive stress and imbalance most of the time.

III. Feedback

The following are participants' comments from events in the United States, Japan, and Hong Kong which reflect the above points:

> "Of particular interest to me were the breathing exercises and progressive relaxation techniques." (Manager)
>
> "...this is the only time I can fall asleep in the classroom without guilty feelings." (Supervisor)
>
> "I enjoyed your method of meditation. I have never experienced relaxation in this manner." (Supervisor)
>
> "Affirmation practice seems to be a simple enough method in dealing with negative subconscious messages...." (Ticketing Agent)
>
> "We must think positively--then the whole world of options will open up before us." (Sales Agent)
>
> "The negativity which I felt and still in many ways feel is self-created, not created by my boss and that is quite a realization in itself." (Supervisor)

"So many things happened in 3 days--it's hard for everything to sink in immediately--superlearning, suggestology, visualization, affirmation, etc., but basically it is the inward looking at oneself...which interested me." (Ticketing Agent)

"From the beginning it seemed that something is opening my brain wide-open and tapping and feeding me with things I wanted for a long time." (Operations Supervisor)

"I found it (the seminar) very stimulating and most relaxing, which was also due to the soothing music in the background..." (Reservations Agent)

"The two main gains for myself in this course were the topics of relaxation and positive mental thinking." (Reservations Agent)

"...I know that I will have bad times along the way but maybe I'll be able to do something about those bad times. I really like the concept of affirmation and I'm going to give it my best." (Sales Representative)

"I found this class exciting and will definitely apply these methods of relaxation and affirmation to make myself a happier person." (Operations Agent)

"Also, we could teach ourselves how to make our work lively and interesting." (Operations Agent)

In connection with the T.A. presentation:

"What impressed me the most was the amount of depth that was able to come across in the midst of an explanation that was the clearest and simplest that I have received for T.A."

"The pacing is difficult for my 'hurry up'--so while valuable, it was at times frustrating." (T.A.-Oakland)

IV. Areas of Application

We haven't thus far applied suggestology for teaching work routines or technical skills. We used it mainly in nontechnical training sessions where emphasis is on self-motivation and attitudes, e.g., people and customer contact, stress management, work relationship events, etc., after which we cannot observe clearly defined and measurable terminal behaviors.

Desirable "terminal" effects for us in these events are statements of commitment, to make a change, to try out new things, or expressions of having gained more insights of oneself, etc. This may sound hazy and vague, yet we experienced suggestology as a greatly vitalizing and self-motivating agent, assisting people to get out of the rut, or at least make a decision for taking more active responsibility and for deriving more work satisfactions thus reducing frustration about perceptions of work as boring, routine, etc.

V. Conclusions

We benefitted from the suggestive-accelerative teaching mode mainly as a mind opener and stimulator to perceive and accept work as an activity offering more fulfillment and a challenge to experience intrinsic satisfaction. It is a tool to access and educate heretofore unreachable capacities of the subconscious mind.

This development is timely, especially in our environment where people have become so incredibly smart intellectually, and where many people even have excessive "smarts" to succeed on a given job (over-qualified or under-utilized). For instance, we observe that mistakes are not so much caused by lack of knowledge or technical skill as by factors such as stress, frustration, preoccupation, ill feelings, boredom, etc.

Intellect and technology, technical skill and expertise can hardly lead to any more quantum jumps in productivity and efficiency. It is now clearly within the subconscious mind of people where the action is.

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Sugestión, aceleración funcionando en el entrenamiento industrial.

El autor detalla sus experiencias en la aplicación de la sugestopedia en una compania aérea en varios seminarios para entrenamiento de empleados.

L'application et le fonctionnement de SALT dans l'entrainement industriel.

L'auteur présente en détail ses expériences en ce qui concerne l'adaptation de la suggestologie à un compagnie d'aviation et, en particulier, à des séminaires de formation d'employés.

Suggestive, beschleunigte Arbeitsweise in industriellen Lehrprogrammen.

Der Autor schildert seine Erfahrungen mit dem Gebrauch von Suggestopädie in verschiedenen Angestelltenseminaren einer Fluggesellschaft.

J. of the Society for Accelerative Learning and Teaching, 1983, 8(3&4)

Contents and Boundaries of Understanding "Intensive Training"

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Abstract. This is a position paper on the state of the art of intensive, accelerative teaching methods in the Soviet Union. While based on Lozanov's Suggestopedia, accelerative teaching methods in the USSR have advanced by attending to, and utilizing, social group dynamics. Information on the use in the USSR of these intensive methods is also given along with a discussion of definitional problems.

In the teaching of foreign languages, it is advised to understand by the term "intensive methods" itself, that it is directed at the mastery of a living oral language and its comprehension (that is, socially interacting in the language of instruction), leaning not on fulfilling general instruction with the psychological reserves of personality and the activity of repeating in particular, but on the management of social-psychological processes of groups and the management of the sociability of the teacher with repeating and repetition among themselves, and its usual accomplishment in the pressure of a school term (2 weeks, 1 month or several months) and with great daily concentration of time (4-5 hours).

The most well-known variation of intensive teaching is the "suggestopedic" method of G. Lozanov (Bulgaria), developed in the mid-60s and originally oriented towards a short course for adults leaving the country. After 100-120 hours involved, it guarantees mastery of a living language and understanding of its limits in some scores of typical situations and about 2500 linguistic units (words, syntax and common sentences).

In the USSR at the beginning of this period (starting 1960, finishing in the 1970s), Lozanov's method was utilized even though its theoretical basis was not well suited for us. Further, getting away from this method but frequently using its principles and methods, Soviet specialists created a series of their methods ("the emotional-meaningful method" of E. U. Shakhter, "the method of activating the reserve capacities of the personality" of G. A. Kitaigorodskaya and others). A new psychological-didactic rationale of intensive teaching developed. Found along the way was the union of intensive methods with the customary one of teaching foreign languages in the Soviet Union, the generally-acknowledged practical method. The intensive methods were well thought-out as a unique realization of several progressive tendencies in general pedagogy and didactics (the creation of an emotional climate for teaching, elucidating the role of process in teaching, etc.).

There exists in the Soviet Union at the present time about 25 organizational units (groups, faculties, laboratories), working with several variants of intensive teaching, not counting individual teachers. They include English, French, German, Spanish, Russian as a foreign language and Russian as a second language for Soviet citizens, not counting them carefully. From the experimental state, intensive teaching shifted to the practical: it produced more than 5000 participants. Prepared were more than 200 teachers, masters of the methods of intensive instruction; about 50 supporting textbooks of various types were published. The instruction proceeded with various contingents of participants with help in varied forms: short courses preparing specialists, courses to advance the qualifications of school teachers, intermediate schools (experimental instruction), preparing faculty for foreign citizens (Russian language), ten-month courses for students from foreign countries, and also courses for the advancement of qualifications of foreign teachers of the Russian language.

Intensive instruction in practice in this fashion already has pulled itself together and is accepted by a majority of teachers as a specific system of teaching, differing in a series of parameters from the usual methods of teaching foreign languages at the present time. The orginally clear question yet remains, and that is the question under which conditions are we able to speak rightly of intensive teaching, where non-intensive instruction stops and intensive instruction starts. In this regard in recent years, on the basis of experiments and principles of intensive teaching, a series of concrete methods was created and formulated bearing a compromised character and even corresponding to the idea (notion) "intensive instruction on a strict basis," versus the notion "intensive instruction." Finally, a series of methods exists specifically for the problems and useable resources, but not often realized principles, of positions for the foundation of intensive instruction in several varying forms. For example, the idea of suggestive reaction is extended to the so-called suggestive-cybernetic instruction. There is a series of general positions for the representatives of really intensive instruction and relaxopedia (Geichman, 1977).

Let's analyze the general characteristics of criteria by which one could define the meaning of the term "intensive instruction." Clearly the characteristic of contingency which is usually distinguishing in intensive instruction and often performs a differentiating feature, cannot (give us) the proper relation for understanding this term. Practically as already stated, the various forms of intensive instruction at the limits of experimental measurements immediately cover the same various categories of teachers. One may classify all of them on the basis of three types: public school, university, and post-graduate education. Accordingly, the bases for organizing the forms of instruction are changed. The second criterion which sometimes is used to define intensive instruction is the period of instruction. In a few words, intensive instruction is identified with short courses. Thus, for example, the textbook of O. P. Rassudovoy and L. V. Stepanovoy, in the thoughts of the authors, is a complex "intensive course of Russian" which on this basis is intended for teaching within the limits of two weeks to a month and a half. In a similar fashion, the definition constrained by the concentrated time of study, by the dated isolated given course, that is, its comparative autonomy, etc. is hardly acceptable.

All these criteria of intensive instruction carry a clean, tidy external appearance but do not reflect those principles and essentials of distinction which are characteristic of intensive instruction as a methodical system.

Here, in our opinion, in this article one can attack what is meant by methodical system and concrete methodical instruction. Evidently a methodical system presents its mutuality (reciprocality) as a definitive aspect of teaching, of methodical means used in pedagogical practice, and most importantly, those psychological and didactic bases which a given methodical system appears to use. In this sense, intensive instruction is both a definite methodical system uniting individual aspects of content and principles, and a realization of varying concrete methods (systems of methodic means). We especially fault the difference between methodical system and concrete methods, such that one and the other means can be utilized for different aspects. In particular, the means used in intensive instruction often can easily be carried over to conventional instruction, but from the latter one cannot convert to the intensive.

Which of these aspects are in intensive instruction? One can formulate them in the following fashion: in a minimum period of time achieve the maximum amount of learning text material. One can see in this formulation that one cannot really address the problem of proportional acquisition of all aspects of language activities, and that this does not really demand practice. Really intensive instruction specifies the forming of habits, and only knowledge of several aspects of language activity, only laying a foundation for acquisition and its concerns. In practice, this stands for all acquisition more often of knowledge for interacting socially with the foreign language (listening and speaking) and requirements for these practices.

Such a formulation of aims and uses (measures) for their accomplishment defines methodic means fully compatible with a high concentration of teaching hours.

What is there in the contents of intensive instruction? The content of intensive teaching is mastery of a complex of habits and learning, achievable and essential for effective accomplishment of activity in a specific region, also mastery of the language material, specified formulation, development and use of these patterns and learning. Still not touched on in this given definition is one region of intensive instruction: its teaching function. Intensive teaching in this very respect comes forward as a desired, fully valuable methodic system in its teaching function. A very important characteristic of intensive instruction consists exactly of an organic unity of these two functions at several levels close to specific methodical levels. Not fearing a paradox, one can say the educational region of intensive instruction enables the teaching function, and the teaching the function of education. In essence, such a demand exists on the desired methodical system; only just now at the present time in intensive instruction has there been accomplished such an organic unity of the greatest consequence.

In this fashion, there yet remains the important question, on which principles is a given methodic system based that allows it to realize a given content and goals? Speaking more simply, what happens to the possible decision with two apparently simultaneous but contradictory problems, minimizing time versus maximizing total effect?

Psychological-didactic, or better, psychological-pedagogical principles of intensive instruction one can divide into psychological- pedagogical principles of organizing teaching activities and psychological-methodical principles of teaching activities from a given viewpoint.

Psychological-pedagogical principles of organizing teaching activities are an appropriate organization of knowledge and formulation of patterns via a system of collective action, enabling the internal mobilization of individual capabilities of each student and effectively using these capabilities in classroom activities. One can express these principles in the general formula: "in the collective and through the collective." Simultaneously in external form and resource in the organization of such a system of actions, there appears a conscious and fully-directed mastery of the processes of group instruction. Under this condition, there appears advancement in the creative role of the teacher, maximizing the realizing of individual capabilities for the goals of education and instruction, which in turn are impossible without the fully-directed and controlled pedagogical instructon. Further detailed analysis of the principles characterized above can be found in the series of publications by the authors of this article (Kitaigorodskaya, 1979; Leontiev, 1979). In the union of these principles one can characterize a general strategy of intensive instruction.

Psychological-methodic principles of intensive instruction one can investigate with a strategy flowing out of its general strategy, and as a link between general psychological-pedagogical principles and uses of intensive instruction with concrete methodic means.

Here with the first principle, there appears a concentrated organization of the process of instruction. This designates that for the transfer from habits of reproduction of oral expressions in a given situation and for given goals, to their active production and situational variations that an intermediate level of basic cleverness is essential for the beginning speaking experience and its systematization. Immediately the original communicative kernel is formulated for future mastery socially in the target language. One can conditionally judge this stage in a first attempt by how much it brings together the communicative kernel and the practical specified sociability, even though at a relatively elementary level mastery of a definite volume of language material is essential; and in this way, this stage appears relatively terminal. Further much material learned at the first stage is specified at a higher level of analytical student activity and its relative ease to transfer these analytical operations to new language material. It is essential to have in mind that this second level in its measurement (evaluation) does not turn out to be a simple reflex for the language experience. This reflex bearing a fully or partially recognized character arises as a consequence of new problems which at this stage appear before the students, problems again communicative. In this fashion, one can say that for effective socializing of students, one must force preoccupation with structural and systematic analysis appropriate to their language material in which the teacher assists. It is important to notice that the major essential of a similar stage can be united at different times with varying stages in the process of instruction. Thus, in the method at the well-known laboratory of new methods of teaching at Tbilisi State University, the so-called mid-cycle stage is being elaborated and similarly at the prestigious laboratory for the activation of teaching activities at Moscow State University, principally the problems internal to the first cycle (beginning stage of teaching) are being resolved.

Finally, the third stage concentration presents a completely new synthesis, that is, formation of creative learning products and situational variations of expressed speech under complicated conditions and new spoken material.

The second psychological-methodical principle of intensive instruction leads one to the global use of all possible resources and channels of influences for mental instruction. We keep in mind not only the support simultaneously of auditory and written reception, that in the method of Lozanov, the so-called two-planes, that is the simultaneous task of conscious and unconscious mastery of the speaking pattern and the corresponding language material, but also the maximum support of the cognitive, emotional, and other processes mutually involved, and the facilitation and intensification of their passing. For example, the creation in the students of the so-called operational effort condition, that is, the emotional condition leading to the desired optimum of their activities, extremely positively influences the effectiveness. The creation for those concerned of a pleasant emotional climate and simultaneously emotional activation in the students play a positive role in the educational plan as one of the resources of reaction in the personality of the students.

With the frequent application or use of this principle, the maximum use of nonverbal communication resources appears, aesthetic resources in action and others.

With the third psychological-methodical principle of intensive instruction one can count the reciprocal activity of pedagogical sociability of role and proper individual elements. Enlarging on this presentation, that at the foundation of intensive instruction lies clearly the sociability role, doesn't agree with effectiveness (reality). It appears to be not an obligatory principle, but as an occasional effective means in the system of intensive instruction except in constant mutual activity of individual socializing. The role of individual social intercourse in its functions in the pedagogical process appears, as with individual situations, to form itself to overcome role problems. Therefore, the following incomplete view of sociability for various stages of learning (even to the limits of the beginning stage) changes, and the function of the role of socializing by degrees brings us to the individual. Transfer from role to individual socializing designates the transfer of teaching from classroom-commnicative to real-communicative activity; even further, this activity can be accomplished in role-playing forms. Even the notion of role here is changed in a radical fashion as one can see: in order to avoid terminalogical confusion, one can accordingly bring in a working definition of classroom roles.

It is clear from what has been said that far from all methodical means are used in foreign language instruction. In the following area, their realization demands a systematic utilization of effective methodic means both simultaneously and sequentially. Helpful means in their mutuality and correspondence with different stages of teaching and with repeated concrete problems are described (Gegechkori, 1978).

It is essential to notice that the characteristic higher psychological-pedagogical principles of organizing classroom activity and the psychological-methodical principles of instruction, and even those used in different variations of intensive instruction, often use a different theoretical formulation that screens out, in our opinion, a circle of theoretical and concrete methodic problems which are found in the center of attention of this or another author and, representative of the collective. The difference in this case leads to a different erection or consideration of aspects, to the pre-eminent analysis of general theoretical problems.

In this article, we have presented our task, giving only general characteristic details of intensive instruction. It seems that such a characteristic permits first a greater opportunity to define the essentials of a given methodical system, cleanly excluding from the search its external parameters; second the chance to delimit intensive instruction from the different concrete methods of methodical systems, either coinciding with them in formulated parameters or realized in part with principles forming its foundation.

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Contenidos y términos del entendimiento del "Entrenamiento Acelerativo".

Este es un estudio de posición sobre el estado del arte de los métodos de la enseñanza intensiva y acelerativa en la Unión Soviética. Métodos de enseñanza acelerativa en URSS basados en la Sugestopedia de Lozanov han avanzado mediante la asistencia y utilización de la dinámica de grupo social. La información en la URSS sobre el uso de estos métodos intensivos es también dada a lo largo con una discusión de problemas definicionales.

Le contenu de la formation intensive et les limites concernant la compréhension de cette approche.

Voici un rapport de position concernant l'état présent en URSS de méthodes d'enseignement intensives et accélérées. Tout en étant basées sur la suggestopédie de Lozanov, les méthodes d'enseignement accélérées en URSS ont fait des progrès, surtout par la considération et l'utilisation de la dynamique sociale de groupe. On fournit des renseignements à propos de l'emploi en URSS de ces méthodes intensives et en même temps on discute quelques problèmes conceptuels.

Inhalt und Grenzen des Verstehens von "intensivem Training."

Dies ist ein Bericht über die aktuelle Situation von intensiven, beschleunigenden Lehrmethoden in den UdSSR. Die dort beschleunigenden Lehrmethoden, die auf Lozanovs Suggestopädie basieren, wirken sich auch fortschrittlich aus in der Anwendung für die Soziogruppendynamik. Es wird Auskunft über den Gebrauch von diesen Intensivmethoden in den UdSSR und eine Diskussion von Bedeutungsproblemen des Fachvocabulars gegeben.

J. of the Society for Accelerative Learning and Teaching, 1983, 8(3&4)

Yoga Factors in Accelerative Learning

W. Jane Bancroft

Abstract. Unconscious assimilation plays an important role in the learning process in an era when television has altered, at least according to Marshall McLuhan, the way in which students absorb information. A number of methods based in whole, or in part, on unconscious assimilation have been developed in the last twenty (or, in some cases, forty) years, among them: Suggestology/Suggestopedia, Sophrology, the Tomatis Method, Soviet hypnopedia, the Suzuki approach. All these methods assume that the acquisition of information can occur in those states which are considered to be below the optimal level of consciousness. Whether developed in Bulgaria, Spain, France, the Soviet Union or Japan, the systems under discussion have been inspired by raja yoga or zen, as well as by philosophies more familiar to the West. It is the aim of this paper to discuss the common elements of these methods and to indicate which of the common elements come from yoga.

In the 1960s, a Bulgarian medical doctor, Georgi Lozanov, discovered that certain yogic techniques of physical and mental relaxation could be used to produce not only relief from pain but also improved memory and concentration. His system, Suggestology, which was originally used in medicine and psychotherapy, was subsequently applied to education--in particular, to subjects like foreign languages which require, at least initially, the memorization of large amounts of basic factual materials. In the late 1960s and early 1970s, at the Institute of Suggestology headed by Dr. Lozanov, a team of experts led by Aleko Novakov combined yoga relaxation and verbal suggestion with the direct method to produce a unique system of foreign language teaching: Suggestopedia.

It was also in the 1960s that a Colombian medical doctor, then resident in Spain, Alfonso Caycedo, discovered independently of Dr. Lozanov that yogic techniques of relaxation could produce a state of analgesia and/or hypermnesia. At the Instituto Alfonso Caycedo in Barcelona, Spain in the 1970s and now in the Federatión Mundial de Sofrología headquarters in Bogotá, Colombia, work in Sophrology has been based on techniques derived from the ancient East in addition to Western Europe. Educators have taken from Sophrology its special voice training (Ternos Logos) and its techniques of physical and mental relaxation (including breathing, visualization and concentration exercises) which, like those originally used in the Lozanov Method, greatly improve memory and concentration. Within the context of Sophrology, Dr. Caycedo has developed a memory training system, Entrenamiento Sofrológico de la Memoría, which is very similar to the original Suggestopedic concentration/relaxation session.

In the 1950s in France, Dr. Alfred Tomatis began his research into the ear and the voice and subsequently developed his own unique system for treating dyslexia and communication problems, on the one hand, and teaching basic elements of foreign languages, on the other. A medical doctor, therapist and researcher who, like Lozanov and Caycedo, has been influenced by yoga, Tomatis emphasizes the training of the ear and the development of the memory through listening and repetition, as well as unconscious assimilation of, or indirect attention to, program materials. Two of Tomatis' important discoveries include the "electronic ear," a special machine placed between the earphones and the tape recorder, which retrains the subject's ear to hear foreign language sounds in the manner of the appropriate native speaker, and "filtered music" that gradually reproduces the high-frequency sound conditions of the mother's womb and which is used in the passive phase of Tomatis' programs for the treatment of dyslexia and communication problems.

Soviet hypnopedia (or sleep-learning) is based on the hypothesis that learning, i.e., rote learning, can occur in a state of reduced conscious awareness, providing that the appropriate materials have already been presented to the students when they are in a wide-awake and fully alert state. Soviet hypnopedia makes use of the period of paradoxical (or light) sleep that usually occurs just as one is falling into a deep sleep after going to bed and just before one awakens in the morning. During a typical hypnopedic session, familiar lesson material (foreign language vocabulary, for example) is presented to the students in the form of paired associates, and repetition, rhythm and intonation (or tone of voice) are used as aids to memorization.

The Talent Education Method of Shinichi Suzuki, which had its origins in Japan some forty years ago, is principally used for the teaching of music in North America, although it has been used in Japan to teach academic subjects; mathematics, Japanese and English, for example. Suzuki based his music method on the way children learn their mother tongue; a method in which speaking precedes reading, pronunciation is developed through listening, and individual words and phrases are repeated over and over until they are learned and absorbed. In the conception of his approach, he was very much influenced by Japanese zen. The Suzuki method emphasizes the training of the ear and the development of memory through listening and repetition. Most importantly, it promotes indirect attention to, and/or unconscious absorption of lesson materials while the pupils are in a relaxed state or in a state of light sleep. Tape recordings of the music are made with several repetitions on the tape or use is made of endless cassettes that repeat continuously. The piece which is to be learned is played beforehand to the pupil every day by means of these tape recordings when the child is engaged in some other activity (games, drawing, for example) or when the child lies in bed at night and is beginning to fall asleep.

Of the five methods under discussion, Suggestopedia, the Tomatis Method, Sophrology and the Suzuki approach emphasize the teacher's authority and sympathetic attitude, the special pact of confidence between teacher and student, the role of the physical, social and/or family environment and the untapped potential of the learner. All five methods stress the importance of intonation or tone of voice as well as rhythm in the presentation of lesson materials. Suggestopedia, the Tomatis Method, and the Talent Education Method of Suzuki favor the use of baroque or classical music, especially that for violin, as a memory-training or linguistic-structuring device. Tomatis' research, in particular, has shown that the violin, the musical instrument with the most high frequencies, reproduces the soothing atmosphere of the mother's womb on the one hand, and stimulates the cortex on the other. Suggestopedia, the Tomatis Method, the Suzuki approach and Sophrology, in accordance with modern holistic education on the one hand, and the ancient discipline of yoga on the other, aim to develop the whole personality of the individual in a pleasant and positive learning environment.

The theoretical part of the methods under discussion comes very largely from yoga: the authority of the teacher-guru, the confidence and infantilization of the student, a positive and pleasant physical and social environment, intonation or the correct positioning of the voice, and rhythmic presentation of material. Insofar as the practical aspect is concerned, all five methods in question promote indirect attention to and/or unconscious absorption of lesson materials while the students are in a relaxed state (the yogic state of relaxed alertness). Suggestopedia, the Tomatis Method, Soviet hypnopedia and Sophrology comprise both an active and a passive phase or session (an active phase for outward concentration on the material and a passive session for inner meditation on the material) following the precepts of the two-part meditation session in yoga with the students in the so-called alpha state, relaxed but nonetheless alert. While Sophrology and the Tomatis Method begin the special memory-training session with a passive phase, Suggestopedia and Soviet hypnopedia begin with an active one. The Suzuki approach favors what might be termed a passive phase, during which the musical piece to be memorized is played to the pupil as he or she is falling asleep, before an active one of reading the music or actually playing the piece.

As developed by Aleko Novakov at the Institute of Suggestology, the original Suggestopedic language class featured a relaxation session for unconscious assimilation of the lesson material. (It will be remembered that the session was usually the conclusion of a three-part intensive class that also included conversational review and presentation of new material.) The session or séance as it was known was divided into two parts, active and passive, with each part comprising twenty minutes, the ideal meditation period in yoga. During the active part, the teacher presented the appropriate foreign- language words or phrases with three different yogic intonations- declarative, whisper, loud command--while the students looked at the dialogue on the printed page and repeated to themselves (using inner speech) the appropriate foreign words and phrases. During the passive part, the teacher read the language dialogue a second time but now in a soft, persuasive voice over a background of slow movements (MM 60) from baroque concerti grossi while the students, with eyes closed and in a relaxed posture, meditated on the text. In the two parts of the session, the material was presented rhythmically on an eight-second cycle: two seconds, translation; four seconds, foreign language phrase; two seconds, pause. The students were trained to breathe deeply and rhythmically in accordance with the teacher's voice and/or the baroque slow movements. The original Suggestopedic séance contained a number of yogic elements: a two-part meditation session, twenty-minute segments, three intonations, inner speech (from the mantra in yoga), voice quality, a music rhythm of 60 beats to the minute (the ideal rhythm for meditation in Indian music), coordination of thought and breath and/or music, a relaxed posture in a special chair.

While Suggestopedia is ideally suited to rote memorization of basic factual materials and is what one might term "teacher-directed," the Sophrology memory-training system is designed to improve the memory in a global sense and is what one might call "inner-directed." Caycedo's method is based on EFARP: evocation, fixation, association, repetition, presentation. For training the memory, important body elements are: abdominal respiration and coordination of breathing with thought or image, proper cerebral circulation (as aided, for example, by the relaxation of the neck muscles), correct posture(s). A standing posture is used for relaxation exercises, while two seated postures are used for memory training. An inclined seated posture with eyes closed corresponds to the passive session in Suggestopedia and is used for evocation, fixation, and association. A modified zen posture, with back straight up and eyes open, knees bent and feet under the chair, is used for repetition and/or organization and corresponds to the active session in Suggestopedia. In Sophrology, in contrast to Suggestopedia, one normally moves from a deeper level of consciousness to a relaxed but nonetheless alert state. (One can, however, reverse the process if one is studying technical material, for example. First, one looks at the material with intense concentration and in an upright posture. Secondly, one closes one's eyes and, in an inclined, seated posture, one visualizes the main points of what one has read. Then, with eyes open, one re-reads the material to see if the main points have been fully registered.)

Whatever the order of the states of consciousness used in the Sophrology memory training system, it bears a distinct resemblance to the Suggestopedic session. (Caycedo, indeed, in an interview I conducted with him in May 1979, called Suggestopedia the "same system.") Sophrology lays greater emphasis on such yogic elements as visualization, posture(s) and relaxation exercises, as well as breath/thought harmony, but both systems employ a special two-part memory-training session and both stress the importance of voice quality or the correct positioning of the voice.

The Tomatis program consists of two major parts: the passive phase (listening training) during which the child listens to sounds, and the active phase (audio-vocal training) which requires the subject's active and vocal participation. Employed throughout much of the program is the special electronic equipment designed by Tomatis and, in particular, the electronic ear.

During the first (or passive) phase, the child receives auditory stimulation through earphones which include a vibrating device placed on the forehead. Music is used in the initial stages of a "retour sonique", a return to the high-frequency sound conditions of the mother's womb. The child listens to Mozart's symphonies or violin concerti (for Tomatis, Mozart is the universal composer, although such baroque composers as Vivaldi are also used). At first, the music is unfiltered, but as the thirty-five minute sessions proceed, the music becomes more and more filtered so that, finally, only those frequencies above 8,000 Herz are present in the musical piece.

With session fifteen, the child begins listening to a recording of the mother's voice, at first in a very filtered form, i.e., only those frequencies above 8,000 Herz are present. The mother's voice is perceived as one perceived it in the womb. From sessions fifteen through fifty, in the various stages of what is called an "accouchement sonique" (sonic birth), the mother's voice becomes less filtered as the missing frequencies are gradually reintroduced. In the same way as a baby progressively hears during the ten days after birth in his evolution from the liquid world of the foetal ear to the sound world of air, one begins to hear a thin voice, then a more complete voice and finally the full voice of the mother reading a story. The mother undergoes voice training, if necessary, in order to learn to position her voice correctly and the reading proper is done under the electronic ear to improve the timbre of the voice.

The purpose of the active training phase in the Tomatis Method is to help the child use his new listening ability properly. During this phase, the child is asked to listen to tapes of different kinds (songs, words, sentences, for example) while under the electronic ear and to reproduce vocally what he hears into a microphone. Singing is particularly favored as a memory-training and linguistic-structuring device. The reproduced sound is automatically adjusted by the electronic equipment so that the child hears his or her own voice correctly. During the audio-vocal training period, a balance system permits the sounds to be focused progressively on the right ear, i.e., the left hemisphere of the brain, which Tomatis believes is the key to proper listening. The child is encouraged to read aloud, both during the sessions and at home. This active phase continues through a series of sessions and control interviews until a combination of the results of the listening tests, observations, reading tests, and interviews signals an end to the program.

The Tomatis Method is not as directly based on yoga as either the Suggestopedic séance or the Sophrology memory-training system. Nonetheless, in addition to a combination of images and phonetics exercises during foreign language programs, which combination of audio and visual elements is reminiscent of the active session in Suggestopedia, the Tomatis Method uses active and passive phases, rhythm and music and, like yoga, Suggestopedia and Sophrology, emphasizes voice quality and mind/body harmony.

As initiated and developed in the Soviet Union by such researchers as A. M. Svyadoshch in Leningrad and L. A.

Bliznitchenko in Kiev, hypnopedia or sleep-learning is intended to be used in conjunction with regular daytime classes in such academic subjects as foreign languages. During the hypnopedic sessions, students in groups of twelve or so hear, repeated over and over, in a slow, rhythmic pattern and with a special intonation, factual elements such as paired associates of foreign language vocabulary that they have already studied in class. In the Soviet Union, sleep-learning is used for the learning (or rather the overlearning) of familiar material. In addition to hearing the material repeated some ten to twelve times during a period of some thirty to fifty minutes at night just before falling into a deep sleep and for some thirty minutes in the morning just before fully awakening, students in Soviet hypnopedic experiments are required, in what may be termed an active session, to listen, read, listen again and loudly repeat the appropriate sleep-learning program in a fully awake state, before the dormitory lights are turned out.

Hypnopedic lessons are kept relatively short (three to six minutes) as the same lesson is repeated some ten to twelve times during the relatively limited duration of hypnopedic sessions in order to fix the contents of the material in the memory. The training material for a given hypnopedic lesson unit contains paired associates which have to be presented rhythmically when they are recorded. The average recording time of a given hypnopedic information unit can vary between three and six seconds; the paired associates must be separated from each other by a pause of approximately five seconds; the items within a given paired associate should also be divided by an inter- pair pause of one to one and one-half seconds. One should be able to program approximately seven to eight hypnopedic information units to be recorded in 60 seconds and a hypnopedic lesson of five minutes' duration can contain approximately 35 to 40 phrases or paired associates.

Intonation has been an essential component of Soviet hypnopedia as developed by Bliznitchenko. Hypnopedic speech must be slow (some ten to twenty percent slower than normal speech) and maintain an even frequency level (120 to 200 Herz). Although Soviet hypnopedia was probably not designed to be based on yoga, in addition to the importance of intonation or voice quality, the sleep-learning method emphasizes rhythm and features active and passive sessions.

The Suzuki approach to music education begins with listening and the development of the ear and the memory. Ideally, according to Suzuki, music training should begin at home from the moment of the child's birth. A short masterpiece or movement from a masterpiece by one of the great composers is selected and that one selection is played every day for the baby. Baroque compositions are often used because of their clear rhythmic structures, uncomplicated harmonies and/or sustained melodies. After about five months, the baby will have learned, i.e., absorbed, the selection; at that point, another selection is added. The baby now hears two pieces every day. Following this pattern or musical progression, the baby will grow into a child who is sensitive to music. Suzuki stresses that, in addition to soothing the baby, listening to good music motivates the child to want to play that music later on, develops his musical memory and improves his future ability to play by ear.

Once the child's ear for music has been developed through repetitive listening, he or she is ready to begin to learn to play a given instrument, e.g., violin, piano or cello. Suzuki pupils usually begin lessons at age three or four. In the lessons, tone production and posture are emphasized; rhythmic games are used; relaxation, breathing and visualization exercises may be included. Once the child has begun his music lessons, both private and group, home practice plays an important role and regular practice is an important part of the Suzuki method. The development of the ear continues to be emphasized, however. The piece which is to be learned should always be played beforehand to the pupil every day by means of good quality records or tape recordings; the piece is memorized in advance and then the child is taught to play it. The pupil should also continue to listen to the appropriate records or tapes while he is learning the piece.

While listening to the music being played, the child can be engaged in some other activity. Through indirect attention, and as with television advertising, the child easily absorbs the musical sounds at an unconscious level. Some parents prefer to play recordings as the child lies in bed at night. Corresponding to hypnopedia, the child absorbs the musical structures while he is falling asleep or while he is in a state of light sleep.

For the beginner, listening is the preferred memory aid in the Suzuki Method. However, for the older student, who may be unable to memorize as effortlessly as a child, a number of zen or yoga techniques are used, techniques which are similar to those used in the original Suggestopedic session. Some Suzuki students listen to recordings with the music in front of them, corresponding to the original active session in Suggestopedia in which the students both looked at and listened to the language dialogue. A proven aid to the more advanced student is the purely visual one. Music can be studied visually during the time in bed before the student goes to sleep as the mind's retention is very high at this time. Corresponding to the use of inner speech in the active part of the Suggestopedic séance, internal singing is recommended by some Suzuki Method experts. Internal singing helps exclude verbalized thoughts much as does the mantra in yoga, improves concentration on the music and, according to Suzuki, gives the music "breath and spirit."

Suzuki's Talent Education Method thus contains a number of yoga or zen elements: posture, tone production and rhythm; relaxation and visualization exercises; and internal singing. It is designed to promote mind/body harmony and, like the other methods under discussion, features active and passive phases or sessions.

As confirmed by experimental data, e.g., in SALT experiments in the United States, adaptations of Suggestopedia speeded up learning and improved retention by 2.5 to 3 times, the success of the five methods discussed in this paper would appear to depend on the fact that learning takes place in two levels of consciousness: the wide-awake (beta) level and the relaxed (alpha) level. While the order of the active/passive phases or sessions does not seem to be especially important, what appears significant for effective or accelerated learning is that there should be an alternation, a going back and forth, between these two levels of consciousness. Since the younger generation picks up most of its information from watching television and while in a relaxed state, it might be said, in conclusion, that the most important aspect of all these modern methods, regardless of their country of origin, is that they promote, in whole or in part, unconscious assimilation of the materials to be learned, while enhancing the student's ability to learn.

For convenience in summarizing these yoga factors used in the five accelerative learning methods reviewed here, refer to Table 1. With the exception of Soviet hypnopedia, it is obvious the other four methods share many of the 15 yoga factors considered. Even Soviet hypnopedia shares 6 with the others. Suggestopedia and the Suzuki approach use all 15 factors. It is obvious that those five different methods share many common aspects, aspects of yoga.

Table 1.

Yoga Factors in Accelerative Learning

	METHODS				
Yoga Factors	Suggestology/ Suggestopedia*	Sophrology	Tomatis Method	Soviet hypnopedia	Suzuki approach
authority/personality of teacher	x	x	x		x
confidence of student	x	x	x		x
positive environment	x	x	x		x
learner's potential	x	x	x		x
intonation/tone of voice	x	x	x	x	x
rhythm/rhythmic presentation of materials	x	x	x	x	x
mind/body harmony	x	x	x		x
relaxed alertness	x	x	x	x	x
active/passive phases	x	x	x	x	x
unconscious assimilation of materials	x	x	x	x	x
postures(s)	x	x	x		x
breathing techniques	x	x			x
inner speech/internal singing	x				x
visualization (exercises)	x	x			x
memory training	x	x	x	x	x

*Yoga factors listed for Suggestology/Suggestopedia refer to the original version of the method, observed in Bulgaria in the early 1970s.

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Factores yogas en la enseñanza acelerativa.

La asimilación inconsciente juega un papel importante en el proceso de aprendizaje, en una era en que la televisión ha alterado, al menos de acuerdo con Marshall McLuhan, la forma en que los estudiantes absorben la información. Un número de métodos basados totalmente o una parte en la asimilación inconsciente, han sido desarrollados en los últimos 20 años (o en algunos casos 40 años). Entre ellos están: Sugestología/Sugestopedia, Sofrología, el método Tomatis, hipnopedia Soviética y el Acercamiento Susuki. Todos estos métodos asumen que la adquisición de información puede ocurrir en estos estados los cuales se considera están bajo el nivel óptimo de rectitud. Ya sea que se hayan desarrollado en Bulgaria, España, Francia, la Unión Soviética o Japón, los sistemas en discusión han sido inspirados por raja yoga o zen, tan bien como los filósofos más conocidos del occidente. Esto es el propósito de este escrito al discutir los elementos comunes de estos métodos y al indicar cuáles elementos comunes vienen del yoga.

Les facteurs de yoga dans l'apprentissage accéléré.

L'assimilation inconsciente joue un rôle important dans le processus de l'apprentissage, surtout à une époque où la télévision a modifié, du moins selon Marshall McLuhan, la façon dont les étudiants absorbent l'information. Un certain nombre de méthodes que sont basées en tout ou en partie sur l'assimilation inconsciente ont été élaborées dan les 20 derniéres années (ou dans les 40 derniéres années, en certains cas), parmi lesquelles on peu mentionner: la suggestologie/suggestopédie; la sophrologie; la méthode Tomatis; l'hypnopédie soviétique; et l'approche Suzuki. Toutes ces méthodes présument que l'acquisition de l'information peu se réaliser dan des états qu'on considère en général comme au-dessous du niveau optimal de conscience. Ayant été élaborés en des pays aussi différents que la Bulgarie, l'Espagne, la France, l'Union Soviétique et le Japon, ces systémes ont tous été influencés ou même inspirés par le raja yoga ou le zen, ainsi que par des philosophies plus connues en Occident. C'est le but de cet article de discuter les principaux éléments que ces méthodes ont en commun et de préciser quels en sont les éléments qui proviennent du yoga.

Jogafaktoren im beschleunigten Lernen.

Die Einverleibung des Unterbewußtseins spielt eine wichtige Rolle im Lernprozess einer Ära, in der das Fernsehen, nach Marshall McLuhan, die Art und Weise bestimmt,

wodurch die Lernenden Informationen in sich aufnehmen. Einig Methoden, die ganz oder nur zum Teil auf Einverleibung des Unterbewußtseins fußen, wurden in den letzten 20 (oder, in einigen Fällen, 40) Jahren entwickelt, z.B. Suggestologie/Suggestopädie, Sophrologie, die Tomatis Methode, sovietische Hypnopädie und die Suzuki Lehrweise. Diese Methoden nehmen alle an, daß das Aufnehmen von Information auch in jenen Gehirnszuständen vorkommt, die unter der optimalen Bewußtseinsebene liegen. Die hier besprochenen Systeme, gleichgültig ob in Bulgarien, in Spanien, in Frankreich, in der Sowjetunion oder in Japan entwickelt, werden von Raja Joga oder Zen inspiriert, aber auch von bekannteren Philosophien der westlichen Welt. Dieser Aufsatz hat als Ziel, allgemeine Einzelheiten dieser Methoden zu diskutieren und jene aufzuzeigen, die von Joga stammen.

J. of the Society for Accelerative Learning and Teaching, 1983, 8(3&4)

Evaluation of a Vibrating Chair in Facilitating Verbal Learning*

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Abstract. This experimental study investigated the possible benefits of a vibrating chair in facilitating verbal learning. A mixed analysis of variance (ANOV) design with independent variables of subject gender, chair conditions, word list easiness and order was used under controlled laboratory conditions to evaluate the vibrating chair's influence on the dependent variables of word acquisition and retention, and pleasantness and alertness ratings during learning. Subjects were 24 men and 24 women of college student age; most were from an introductory psychology course at the university, but 6 subjects were recruited via a newspaper ad and paid so as to secure enough subjects at the end of classes. There was a significant fatigue effect, as subjects learned fewer words per list on the last three lists learned than on the first three learned. This was paralleled by a drop in alertness.

Unexpectedly, the vibrating chair did not significantly enhance verbal learning above that found when learning words with auditory and visual inputs alone using a conventional chair. Pleasantness ratings during learning tended to parallel this finding. While this study provides no support for the putative benefits of this vibrating chair in enhancing verbal learning of university students, the chair may have application with sensorially-handicapped children.

Introduction

Tomimoto Amano (1982) in his SALT Conference paper at Colorado State University in 1982, claimed that a relaxing lounge chair with vibrators built into the bottom and lower back, stimulated the brain such that students who sat in the chair and studied material could learn material much more easily than sitting in a similar chair without the vibrations. Specifically, the enhancement due to the vibrating plates was maximum when the frequency was approximately 100 Hertz and that the effect decreased below and above this frequency. The purpose of this study was to evaluate these claims in a controlled laboratory study rather than in a commercial language classroom.

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*A note of appreciation is due David Miller for the data collection and computer analyses.

There are two ways the chair may aid learning: 1) the oral instruction conveyed to the student haptically (skin vibrations) via loudspeakers (vibrators) in the lower back area may facilitate learning because it is an additional sensory input channel, or 2) relaxing music played through the chair's loudspeakers haptically may help the students relax, and relaxation does help verbal learning (Schuster & Martin, 1981). This study investigated both possibilities.

Design

The independent variables used in this study are listed here. A mixed analysis of variance (ANOV) design was used with several between-group independent variables and several within-subject independent variables.

Between-group factors

1. Sex of subjects. Half of the subjects were male, half female, with 24 males, 24 females for a total of 48 subjects.
2. List control. One group of subjects took the vocabulary lists in a specific sequence and a second group took them in reverse order to control for practice and/or fatigue effects.
3. Replication. One group of 12 subjects (male or female) constituted the first block, or replication of subjects, and the second group took the vocabulary lists under identical conditions as a second block or replication.

Within subject factors

4. Chair conditions. Subjects were asked to sit and learn vocabulary lists under a number of different chair conditions:
    a. Standard chair (placebo control)
    b. Special chair from T. Amano was used, but the chair was inoperative
    c. Special chair used with white noise as vibratory input
    d. Special chair used with 100 hertz pure sinewave input
    e. Special chair used with baroque music input (Gerwig)
    f. Special chair used with words input for the student to learn

5. List easiness. Subjects learned three easy lists in a counter balanced way and three hard lists with the order counterbalanced over subjects within group. On the basis of previous research, the easy lists averaged approximately one-and-a-half to two words out of 25 correct more than words on the hard lists.
6. Practice or order. The average of the first three lists learned was compared with the average of the last three lists learned, with difficulty and chair condition counterbalanced.

Dependent variables

1. Acquisition score. This was the number of vocabulary words defined correctly right after learning. The subject's task was to define the word in a free recall fashion. Subjects were asked if they had known any words before and, if so, the number correct score was reduced accordingly.
2. Retention score. This was the number of words matched correctly with definitions one week later. The 25 correct definitions were given in alphabetical order with 5 foils included for a total of 30 possibilities.
3. Pleasantness rating. Immediately after the list had been learned, the subject on the acquisition test was asked to indicate how pleasant the learning task had been on a scale ranging from 1 = very unpleasant, through 5 = intermediate, to 9 = very pleasant.
4. Alertness rating. Just after having studied the list, the subject was asked to make a rating of his or her alertness on a scale ranging from 1 = tired, through 5 = intermediate, to 9 = extremely alert.

Procedure

Almost all the subjects were volunteers from introductory psychology undergraduate ISU courses who took part in this ninety- minute experiment to earn extra credit in their coursework. Subjects sat in a chair under the six conditions listed above while learning the lists. All subjects took the same six vocabulary lists in about 50 minutes and returned 7 days later for a posttest taking one hour. At the close of the summer session, we were not quite finished collecting data so we had 6 subjects of approximate college age who responded to an ad for research. These 6 subjects were paid for their participation.

The subjects were greeted at the door by the experimenter and the purpose of the experiment was explained to them. They were asked to read a notice-to-subjects and invited to ask questions. Then they were seated in the chair in a carefully-specified sequence of conditions. This sequence of chair conditions and hard/easy lists was specified according to a modified Greco-Latin Square design (Cochran & Cox, 1957). No completely counterbalanced Greco-Latin Square of 6x6 levels is possible, so the modification consisted of counterbalancing exactly the hardness/easiness over subject's chair conditions as a function of the six tests taken in sequence.

As a constant input, the subject had both auditory and visual inputs to learn the lists under all conditions, and the subject then had the chair conditions varied in a controlled fashion to test the effects of the chair as outlined above. The subject had 6 minutes to learn each list, a vocabulary list of 25 words in front of him/her for all of this time. The experimenter also read slowly (on tape) the rare English word to be learned, gave its common English definition and repeated the rare word at a normal rate, paused and continued with the next word in a similar fashion. This took 3 minutes and the entire list was repeated in an additional 3 minutes for a constant 6 minutes of auditory and visual exposure to each list to be learned.

Results

The analysis of variance summary for effects of gender, list difficulty, chair condition, and sequence on word acquisition and retention are given in Table 1. The effects of list sequence and subject replication were not analyzed as they were control or replication conditions.

The effect of sex of subject or gender was not significant although the results for gender as expected were in the direction of female's having slightly more language facility than males. This effect is tabulated at the bottom of Table 2. None of the interactions with gender as the major between subjects factor was significant. There were a number of significant effects as shown in Table 1 for the within-subject variables of difficulty, sequence, chair condition, and their interactions. Since the highest level interaction between difficulty, sequence and chair condition was significant, this interaction is graphed or depicted in Figure 1. The writer was unable to give any particular interpretation to this significant interaction. The reader is invited to peruse this, and make his/her own. To help an interpretation, the practice effect is shown with a broad base for the first average of lists learned, and with a narrow point for the average of the three lists learned second. Hard and easy conditions are listed "H" and "E" respectively.

The easy lists were significantly easier to learn by about 1.8 words per list than hard lists, and the data are tabulated in Table 2. This is true to a lesser extent for the retention tests, where this effect was also significant.

Table 1

ANOV summary of the effects of gender, difficulty, chair condition and sequence on word acquisition and retention

Source		Acquisition		Retention	
	df	SS	F	SS	F
G, Gender	1	42.78	0.40	57.78	1.43
G*D	1	15.59	0.14	9.75	0.24
G*Q	1	2.17	0.02	9.75	0.24
G*C	5	31.86	0.06	33.45	0.17
G*D*Q	1	2.92	0.03	0.28	0.01
G*D*C	5	131.73	0.25	119.98	0.59
G*Q*C	5	204.89	0.38	71.89	0.36
G*D*Q*C	5	81.64	0.15	54.36	0.27
Error 1	46	4945.94	---	1861.35	---
D, Difficulty	1	243.84	219.79**	57.78	12.77**
Q, Sequence	1	83.42	75.19**	335.84	74.22**
C, Chair condition	5	43.95	7.92**	11.20	0.49
D*Q	1	7.03	6.34*	1.53	0.34
D*C	5	123.39	22.24**	47.61	2.10
Q*C	5	157.39	28.37**	33.98	1.50
D*Q*C	5	220.45	39.74**	68.61	3.03
Error 2	194	215.23	---	877.81	---
Total	287	6338.99	---	3652.98	---

*p<.05, **p<.01

In general, there was a significant decrement from the average of the first three tests learned to the average of the last three lists learned, and this is shown in Table 2 also. The effect was significant both for acquisition and retention. The sequence effect can be interpreted as a fatigue or negative practice effect, in that subjects got tired or bored from the first task to the last task. This was true for almost all of the chair conditions except when the special chair was inoperative. This was the placebo condition and may be interpreted that when the chair vibrated, it interfered with the expectancy of relaxing in such an easy (lounge) chair.

The chair condition means are listed in the middle of Table 2. The regular chair (average = 10.42) was tied for the best learning condition with that of the special chair with noise input (10.42 words learned). The chair, when

Table 2

Average words learned under selected treatment conditions

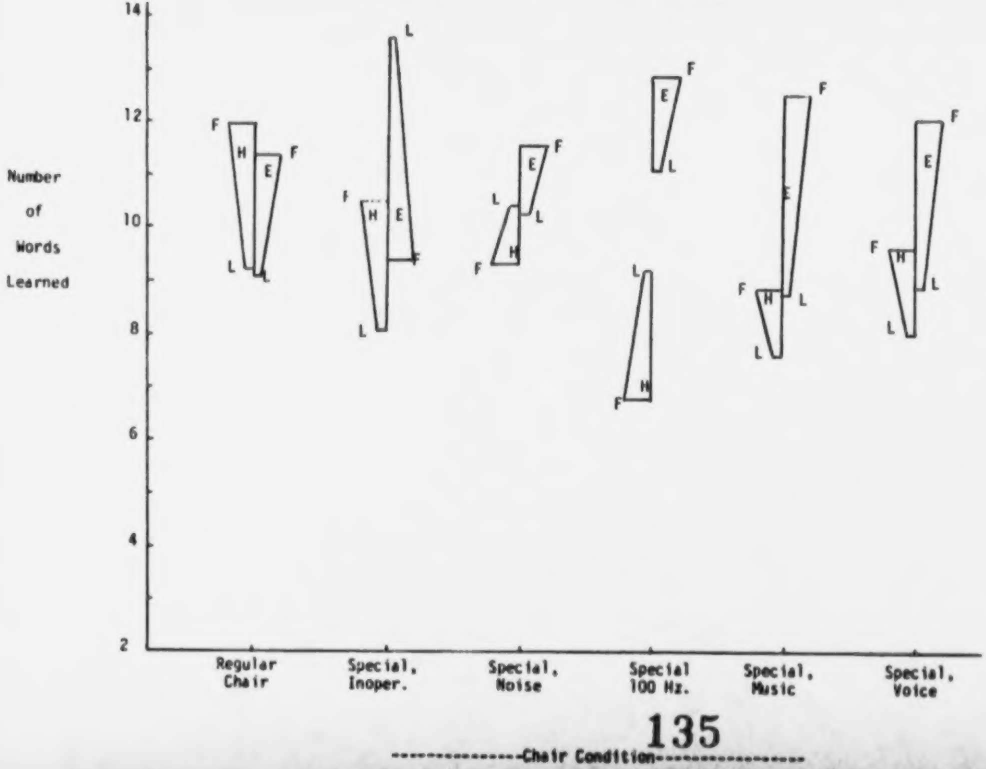
Treatment Condition	n	Acquisition	Retention
Difficulty of list			
Hard	144	9.13	4.23
Easy	144	10.97	5.13
Sequence			
First half	144	10.59	5.76
Last half	144	9.51	3.60
Chair conditions			
Regular chair	48	10.42	4.96
Special, inoperative	48	10.40	4.48
Special, noise	48	10.42	4.81
Special, 100 Hz	48	10.00	4.69
Special, music	48	9.48	4.38
Special, words	48	9.60	4.75
Gender			
Male	24*6	9.67	4.23
Female	24*6	10.44	5.13

vibrating with 100 hertz sine wave input as recommended by Amano (1982), turned out to have an intermediate level of acquisition (10.00 words learned). The expected best condition with words input was one of the poorer conditions (9.60 words learned) and the worst condition was with the baroque music input (9.48 words learned). Thus the chair, when vibrating, does not appear to have any particular additional benefit over hearing and seeing the words to be learned by themselves. These trends are in the opposite direction to that originally hypothesized for this chair.

Although there were no significant effects for chair condition one week later on the retention scores, the average retention scores are listed for comparison. Again the best chair conditions were the regular chair or the special chair with noise, and the worst conditions were when music was played through the chair. No particular heuristic trend can be seen in these data.

Turning to the affective criteria of pleasantness and alertness ratings during learning, there were two significant effects. As shown in Table 3, alertness ratings decreased (F=27.93, df=1/194, p<.01) from the first lists

Fig. 1. -- Number of words learned vs. chair condition, list difficulty (Hard-Easy) and sequence (First-Last). (n = 12 data/point)



learned (average=5.66) to the last lists (average=4.92). This parallels the decrease in learning.

Table 3

Average pleasantness and alertness ratings under selected treatment conditions

Treatment Conditions	n	Pleasantness	Alertness
Sequence			
First half	144	5.16	5.66
Last half	144	5.03	4.92
Chair conditions			
Regular chair	48	5.29	5.50
Special, inoperative	48	5.42	5.60
Special, noise	48	4.98	5.35
Special, 100 Hz	48	4.63	5.27
Special, music	48	5.10	5.02
Special, words	48	5.17	5.00

The chair condition also significantly effected pleasantness ratings (F=2.27, df=5/194, p<.05). The most pleasant conditions were: special chair inoperative (5.42) and regular chair (5.29). Music and words to the chair produced intermediate ratings. The least pleasant ratings were: noise input to special chair (4.98 and 100 Hz sine wave to chair (4.63).

The special vibrating chair did not provide a pleasant learning situation nor did it delay fatigue (reduction in alertness) while learning.

Discussion

The data from this preliminary study under controlled laboratory conditions with U.S. college students offer no support for Amano (1982) and his contention that the vibrating chair with words and/or music input provides facilitation to foreign language learning with Japanese students. Taking the chair out of context from a Suggestopedic environment, we were able to find no support experimentally that the chair facilitates verbal learning. In general, SALT-type variables such as suggestion or music, whether taken in or out of a suggestopedic context, contribute to accelerative learning. This is not to mean that the case for the chair is hopeless. Note that the chair conditions for additional inputs haptically to the subject varied while the subject was learning each list with constant audio and visual inputs from the same list. It is indeed quite possible that due to the special stimulating condition of feeling the words input haptically, that the chair could have particular use in learning situations when one of the two normal inputs, vision or audition, was impaired. This possibility should be explored with visually or auditorily handicapped children.

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Evaluación de una silla vibratoria en la facilitación del aprendizaje verbal.

Este estudio experimental investigó los posibles beneficios de una silla vibratoria en la facilitación del aprendizaje verbal. Un análisis mesclado de diseño de variación (ANOV) con variables independientes de género sujeto, condiciones de la silla, la facilidad de lista de palabras y orden, fue usado en condiciones controladas de laboratorio al evaluar la influencia de la silla vibratoria en las variables dependientes de retensión y adquisición de palabras y la evaluación de satisfacción y agilidad durante el aprendizaje. Los sujetos fueron 24 hombres y 24 mujeres de una edad de estudiantes colegiales. Pero 6 sujetos fueron llamados mediante un aviso en el periódico y pagados para asi asegurar sujetos suficientes al final de las clases. Hubo un efecto significante de fatiga tanto en sujetos que aprendieron pocas palabras por lista en las 3 últimas listas como en las 3 primeras. Inesperadamente, la silla vibratoria no realzó significativamente el aprendizaje verbal, por encima de lo que se encontró cuando se aprendieron palabras con auditorio y entradas visuales al usar solo una silla tradicional.

Evaluaciones placenteras durante el aprendizaje tendieron a comparar este encuentro. Mientras este estudio no provee un soporte para los beneficios supuestos de la silla vibratoria en el incremento del aprendizaje verbal de los estudiantes universitarios, la silla puede tener aplicación con niños sensorialmente incapacitados.

Evaluation d'une chaise vibratoire dans la facilitation de l'apprentissage verbal.

Cette expérience eut pour but une enquête sur les avantages possibles d'une chaise vibratoire en ce qui concerne la facilitation de l'apprentissage verbal. Afin d'évaluer l'influence de la chaise vibratoire sur les variables dépendantes de l'acquisition et de la rétention des mots et de l'appréciation, pendant l'apprentissage, de la vivacité intellectuelle et de l'agrément des étudiants, on a utilisé, dans des conditions de laboratoire contrôlées, un projet d'analyse mixte de variance (ANOV), comprenant des variables indépendantes de sexe du sujet, conditions de la chaise, facilité de la liste des mots et ordre des mots sur la liste. Les sujets comprenaient 24 hommes et 24 femmes dont tous avaient l'âge d'étudiants universitaires. Le plupart de ces sujets étaient membres d'une classe de psychologie élémentaire à l'université; cependant, afin d'obtenir un nombre suffisant de sujets à la fin des classes, on avait recruté 6 sujets par le moyen d'une annonce publicitaire parue dans un journal; ces sujets avaient été payés pour leur participation.

Il y avait un effet de fatigue significatif parce que les sujets avaient appris moins de mots par liste en ce que concerne les 3 dernières listes de mots à apprendre que pendant les 3 premières listes. En même temps il y avait une baisse de la vivacité intellectuelle des étudiants.

Les résultats étaient imprévus en ce qui concerne le fait que la chaise vibratoire n'a pas vraiment amélioré l'apprentissage verbal; dans une chaise ordinaire, les étudiants ont appris tout autant, surtout lorsqu'on a présenté les mots avec l'appui de stimuli audio-visuels. Aucune différence significative non plus concernant l'appréciation de l'agrément de l'apprentissage. Les résultats de cette expérience ne soutiennent pas les prétendus avantages de la chaise vibratoire dans l'amélioration de l'apprentissage verbal des étudiants à l'université. Cependant, il se peut que la chaise vibratoire s'applique à l'éducation des enfants sensoriellement handicapés.

Bewertung eines Vibrationsstuhls für die Förderung des Verballernens.

Dies wissenschaftliche Studie untersucht die mögliche Erleichterung beim Verballernen durch den Gebrauch eines Vibrationsstuhls. Ein Forschungsplan, eine Mischanalyse der Varianz (ANOV), mit den unabhängigen Variablen vom Geschlecht der Versuchspersonen, vom Stand des Stuhls, von der Einfachheit der Wortliste und von der Ordnungsreihe, wurde experimentell verwendet um den Einfluß des Vibrationsstuhls auf die abhängigen Variablen von Wortaufnahme und -behalten, von Wohlgefühls- und Wachsamkeitsbewertungen während des Lernens zu messen. Versu-

chspersonen waren 24 Männer und 24 Frauen im Universitätsalter. Die meisten waren Teilnehmer an einem Einführungskursus in Psychologie an der Universität; aber sechs Teilnehmer rekrutierten sich durch ein Zeitungsinserat und wurden bezahlt, so daß am Ende des Semesters genug Versuchpersonen zur Verfügung standen.

Die Versuchspersonen wiesen signifikante Ermüdungseffekte Ermüdungseffekte auf, indem sie von den letzten drei Listen weniger Wörter pro Liste lernten als von den erstem drei. Parallel dazu war eine Schwächung der Aufmerksamkeit zu bemerken. Unerwarteterweise förderte der Vibrationsstuhl das Verballernen nicht signifikanter als der Gebrauch eines gewöhnlichen Stuhls, wenn Wörter mit hörbaren und sehbaren Stimuli verwendet wurden. Obwohl diese Studie keine Unterstützung für die vermeintlichen Erfolge in Verballernen von Universitätsstudenten durch den Vibrationsstuhl nachweisen kann, wäre der Stuhl möglicherweise verwendbar bei gefühlsbehinderten Kindern.

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